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FORTIS AND LENIS IN GERMANIC

by

GERDA ISOLDE ALEXANDER

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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Date 27 September 1982

To David, Vreni, John and Stephanie

Abstract

This thesis deals with a hypothesis regarding the primary phonemic contrast in the Germanic consonant system. In the standard view a voiced-voiceless contrast is assumed to be characteristic of the Germanic consonants, whereas a fortis-lenis contrast is regarded as specific to Old High German. The hypothesis examined in this thesis goes counter to the standard view by projecting the origin of the fortis-lenis contrast back into Proto-Germanic. It is proposed to view the Germanic consonant shift as the result of lenition in two series: IE /t/ > Gmc. /þ/, IE /dh/ > Gmc. /đ/, and of strengthening of articulation in the third series: IE /d/ > Gmc. /t/. Thus the Indo-European correlations of voice and aspiration are replaced in Germanic by a system of primary and secondary contrasts. Fortis /t/ contrasts with lenis /þ/ and /đ/ in the primary opposition; voice differentiates /þ/ and /đ/ in the secondary contrast. Voice and spirantization are characteristic of the lenis members in Germanic, whereas voicelessness and occlusion accompany strengthening of articulation on the fortis side.

This concept of a fortis-lenis contrast is reflected in the further development of the Germanic consonant system. On the fortis side voiceless stops developed which maintained their fortis character even after their shift into Old High German. On the lenis side spirants developed which underwent further lenition by voicing when they were in weak position

(Verner's Law).

The validity of the fortis-lenis theory was tested by following these principles through from the reconstructed Germanic language into the major Germanic dialects and languages. It was found that the fortis-lenis theory not only supplies a common foundation for the development of consonants in the several Germanic languages, but also provides a common element in the explanation of the First and Second Sound Shift.

Acknowledgment

I wish to express my sincere gratitude to my supervisor Dr. Richard d'Alquen for his guidance and encouragement throughout.

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List of Abbreviations and Symbols

acc. : accusative case

b : unaspirated, voiceless labial stop

cent. : century

cod. : codex

dat. : dative case

gemin. : geminate

gen. : genitive case

Gmc. : Germanic

Go. : Gothic

I : Isidor

IE : Indo-European

Ital. : Italian

Kent. : Kentish

Lat. : Latin

Lgb. : Langobardic

masc. : masculine

MHG : Middle High German

MnE : Modern English

N : Notker

neut. : neuter

NHG : New High German

nom. : nominative case

O : Otfrid

OE : Old English

OHG : Old High German

OI : Old Icelandic

ON : Old Norse

OS : Old Saxon

Proto-Gmc. : Proto-Germanic

Pre-Gmc. : Pre-Germanic

p.t. : past tense

sg. : singular

simpl. : simplex

T : Tatian

WS : West Saxon

I. INTRODUCTION: FORTIS-LENIS OPPOSITION IN GERMANIC

A. Outlining the Topic

Much attention has been given to the Germanic consonant system as the survey of scholarship will reveal, and a fortis-lenis contrast has not been entirely neglected. However, there has been no attempt to attribute to it so large a role as intended in the present study, which aims to examine the Germanic consonant system and its changes, characterized by the contrast of fortis-lenis as the primary distinctive feature of the consonant system.

To place the present work in perspective it is desirable to trace the development of linguistic thought from the 19th century, when the elucidation of consonant change from Indo-European to High German was a concern of high priority. After incorporating findings from acoustic phonetics we shall develop and define a fortis-lenis theory for the Germanic consonant system and test its validity in the following chapters by applying it to various Germanic dialects and languages.

B. Historical Survey

It was not until the early nineteenth century that objective and systematic research in the study of language began to replace the philosophical-speculative investigations which had been current since the

Enlightenment. The historical and comparative study of language began to develop methodological principles aimed at setting up sound laws (*Lautgesetze*). The final triumph of the 'New Grammarian' school of thought was not manifest until the 1870's, when a number of important discoveries revealed regularity in the seemingly irregular development of speech sounds.

This development was part of the general nineteenth-century orientation towards reality, as expressed in the scientific search for 'objective truth' in all matters, which can be found even in the literary movement of Naturalism. Charles Darwin's theory of evolution provided an incentive to study language as a biological organism, subject to laws of growth and decline.

Thus, historical linguistics in the nineteenth century was characterized by a gradual advance toward an understanding of sound change as governed by discernable laws. The discovery of Rasmus Rask (1818) concerning the regular relationship between the sounds of Old Norse and Greek inspired Jacob Grimm (1822) to set up a larger scheme embracing three stages: Indo-European, Germanic and Old High German. Beginning at any stage *tenues* (p t k) became *aspiratae* (f þ x), *aspiratae* became *mediae* (b d g), and *mediae* became *tenues* again. An evolutionary process had been discovered that could be described with laws of sound change operating from Indo-European to High German.

Even before Rask and Grimm, scholars had been aware of regular correspondences among the sounds of the then-known Indo-European languages. Grimm, however, was the first to try to establish a governing principle underlying a complex of phonetic changes, thus bringing the study of language evolution into the realm of natural science. He not only explained the shift of the Proto-Indo-European consonants to Primitive Germanic in the form of a law (the First Sound Shift), but also recognized that the same principle operated in the consonant shift from Germanic into Old High German (the Second Sound Shift). In this way he succeeded in establishing a common pattern for two chronologically separate, complex groups of sound changes. The fact that Grimm's formulation of the law is criticized from the standpoint of a more advanced science of phonetics cannot detract from the contribution he made to nineteenth-century comparative linguistics.

Grimm did not try to determine a relationship between the three consonant series, the *tenues*, *mediae* and *aspiratae*, but rather to establish these as three phonetic stages which remained the same, while the consonants in groups shifted through the stages of the cycle. In other words, his law describes a *Kreislauf* which is the progression of the *tenues*, *mediae* and *aspiratae* in their transition from Indo-European to Germanic to High German.

The systematic research by Grimm which resulted in the formulation of 'Grimm's Law' led to a marked increase in the

study of language. After the publication of Grimm's Law in 1822, much attention was given to finding laws to explain the exceptions. The discoveries of the 'law of palatals' (1878),[1] of 'Grassmann's law' (1863), and especially of 'Verner's Law' (1875) led linguists to believe that residual phonetic forms would finally be explained by new laws. The firm belief that thorough study would yield results, combined with the new concept of analogical change, culminated in the pronouncement of the principle: 'Sound laws admit of no exception'.[2] This was the favourite thesis of the 'Neo-Grammarian' school that came into being in Leipzig in 1876 in united polemical opposition to older views on language. Brugmann, Paul and Leskien - to name a few of the new persuasion - held that to study language scientifically was to examine it historically. Thus, when dealing with the Germanic and High German consonant shifts, they considered the development of the individual sounds rather than the whole system at some given stages. This 'atomistic' view of sound change was criticized severely by later linguists.[3]

---

[1] The discovery of the 'law of palatals' was made by several linguists independently in the early 1870's. It was published, however, only in 1878. See Pedersen (1967: 110).

[2] Pedersen (1967: 133).

[3] Criticising the atomistic approach of the Neo-Grammarians is, however, not always fully justified. The Neo-Grammarian concept of a 'series', meaning all sounds with the same manner of articulation, implies a system, where the evolution of individual sounds, such as *p* > *f*, *b* > *p*, *bh* > *b*, is representative for the evolution of each series. The denial of any connection between the three series regarding the sound changes, however, is subject to fair criticism. Atomism in this context must not be understood as

August Schleicher had taken a different approach to dealing with linguistic change.[4] As a student of Hegel, and strongly influenced by Darwin's theory of natural selection, Schleicher developed a philosophically-inspired theory of language. He adhered to the concept of language as an organism that grows and declines, which is reflected in his doctrine which says that the evolution of language took place only in prehistoric times, whereas in historical times we only find decay. As a consequence of this theory he became slavishly committed to accepting Sanskrit as a very close rendering of the hypothetical parent language of the Indo-European languages, which, according to his reasoning, would not exhibit a trace of decay. His concern to prove and maintain his theory prevented him from letting the facts speak for themselves. Thus, holding on to philosophically founded notions on language, which hindered his understanding of linguistic relationships, he treated the earliest phonological systems as sets of three sounds each, a concept which goes back to the Hegelian triad. One of the errors resulting from this was the concept of three original

---

[3](cont'd)an unsystematic approach to the problem, but rather as a method which due to its strict diachronic orientation ignores the complete system of the language at one point in time.

De Saussure, originally a student of the Neo-Grammarian school, later opposed the exclusive diachronic and atomistic approach to language study. See also J. Fourquet, p. 11-14 of this thesis.

[4] J. Waterman (1970: 31) calls him the 'greatest methodologist of nineteenth century linguistics'.

Indo-European vowels, *a*, *i*, *u*, as represented in Sanskrit, which therefore was regarded as being closest to the Indo-European parent language. The discoveries of the seventies by various scholars, however, proved Schleicher's vowel triad wrong. It is not surprising that this philosophically backed line of research, lacking the success that others obtained by careful examination of facts, was doomed to die out. Nevertheless, Schleicher's *Compendium der vergleichenden Grammatik der indogermanischen Sprachen* (1866) was for a long time the authoritative text.

In summary, it can be said that the achievements of nineteenth century linguistics consisted in a tremendous activity to organize and to classify on a historical phonetic basis a great amount of linguistic material to show regularity in sound change and hence the genetic relationship of members of a language family. Some of the outstanding results are the description of Celtic (Zeuss), the Romance languages (Diez), the Slavic languages (von Miklosich), the development of articulatory description of sounds (Sweet, Ellis, Sievers, Jesperson), and the comparative grammar of Indo-European languages (Schleicher, Brugmann, Delbrück).[5]

Descriptions and comparisons of languages, such as Schleicher's, were diachronically oriented. Continued study in the development of language, however, shifted the interest of scholars from the older languages to the modern

---

[5] F. Dineen (1967: 189).

languages and dialects, which made it possible to observe language change in process. Thus more attention was given to synchronic language study, e.g. phonetics; the bewildering complexity revealed by the new study of dialect geography challenged the supremacy of the genetic view of language change. To understand better the very substance of language, a more accurate description of current language and dialect systems was necessary. The study of language was on the way to discovering the regularity and patterning of languages as they exist at one point in time. Hence a shift in perspective took place from diachronic to synchronic, from 'atomistic' to 'structural'.

In historical terms, the structuralist movement represented a reaction to the neogrammarian principles of linguistic analysis, particularly to the atomistic approach to sound change. A number of schools, which arose between the two world wars, were structurally oriented. Among those, the Prague School became famous for its emphasis on the analysis of the phoneme into relevant features. The Bloomfieldian School saw the importance in the distributional features of the phoneme in words and utterances (B. Trnka 1967). Both agreed that language in its historical development never ceased to be a system.

Against this background of a growing interest in, and weight given to structuralism, the approach and theories of two outstanding scholars still interested primarily in historical linguistics, namely Hirt and Prokosch, will be

outlined with regard to the Germanic and High German consonant shifts.

The author of the *Indogermanische Grammatik* (1927), Hermann Hirt, represents the Indo-European consonant series *p t k, b d g, bh dh gh*, as phonic entities involved in change rather than as phonetic signs. In other words, more than one possible sound is contained in any of these signs. Although Hirt does not elaborate on it, the phonemic concept underlies his treatment of sounds. This is seen in the way he deals with the Indo-European *mediae aspiratae*, whose assumed phonetic reality of aspiration Hirt questions. His implicit phonemic interpretation allows him to bypass this problem and to see those sounds as one series out of three (or four including the labio-velars) with uncertain definition. Dealing with the Germanic and High German consonant shifts he attributes the cause to certain accent conditions which resulted in an increased tension in the muscles forming the occlusion of stops. Overcoming this tension brought about a release accompanied by aspiration. The ensuing development from an aspirated stop to a spirant happened automatically ('*vollzog sich...sozusagen von selbst*' Hirt 1927: 220).

More detailed in the treatment of the consonant shifts is E. Prokosch. He advanced a theory (Prokosch 1939: 49-52), which R. Schrodt calls 'original, but vulnerable' (Schrodt 1974: 206). According to this theory, the Germanic as well

as the High German consonant shift are the result of the 'Fundamental Principle', which consists of predictable phonetic changes. Basic to it are the alternating check and release of the breath stream at the various points of occlusion. (1) In the case of stops, the flow of air issuing from the lungs is completely checked in the mouth, (2) in the case of spirants, the flow of air is only impeded, (3) in the case of voiced sounds, part of the air stream is intercepted by the vibrating cords. Accordingly the changes through which all Indo-European stops and spirants passed, are phonetically described by a check and release of breath:

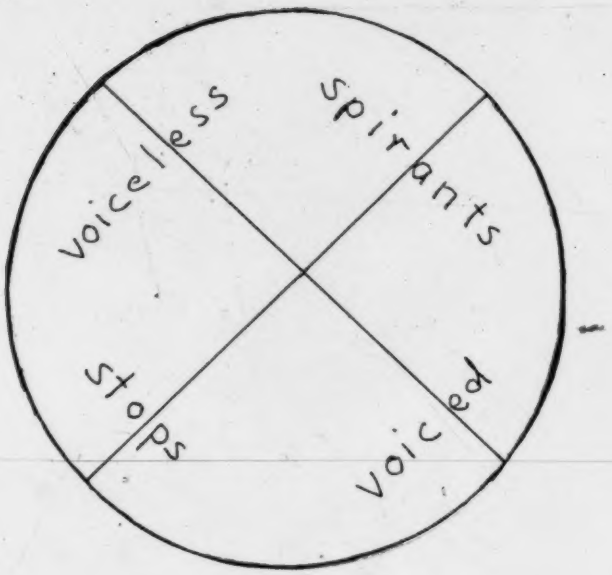
> For instance: t is a voiceless stop. The glottis is open. Consequently the breath is released between tongue and teeth, and þ results. This being a voiceless spirant, the open glottis is closed, so that þ changes to đ . This voiced spirant requires an occlusion in the mouth, thus changing to d, a voiced stop, which then, by release in the glottis, becomes t. (Prokosch 1939: 50)

Combining the Fundamental Principle with the assumption that the Indo-European 'sonant aspirates' were voiceless spirants in lenis articulation, Prokosch interprets Grimm's *Kreislauf* in the following manner:[‘]

[‘] The Roman numerals refer to the ordered stages of the shifts as described in Prokosch (1939: 52).

f þ h

II. VI. I. III. VIII.



p t k b d g

IV. VII. V. IX.

b d g

The changes of the High German consonant shift follow the same general trend in accordance with the Fundamental Principle. However, secondary developments counteracted, leading to slightly different results.

In keeping with the idea of the Fundamental Principle, Verner's Law is not an exception to the consonant shift, but an acceleration of it.

Criticism of Prokosch's theory is centred mainly on his interpretation of the Indo-European *mediae aspiratae*. More important in the present context, however, is that his theory does not deal with phonemes in a structural

framework, but is still rooted in the Neo-Grammarian interpretation of sound shifts.

The first large-scale application of Praguian structural theory to the Germanic and High German consonant shifts was by Jean Fourquet. His monograph *Les mutations consonantiques du germanique*, written during and after World War II, is valued as the 'most outstanding and far-reaching contribution to Germanic phonology in the forties' (Martinet 1949: 291).

For Fourquet it is mandatory to examine the conditions in which a sound occurs:

> Un élément phonétique donné (...) n'est pas encore défini, lorsqu'on a énuméré ses caractères, (...); il faut y ajouter les conditions de son existence, c'est-à-dire les positions où on le trouve, les groupes dans lesquels il peut entrer, les oppositions dont il est un terme (Fourquet 1948: 122).

This presupposition to phonological approach dissociates Fourquet from the Neo-Grammarian tradition, where atomistic formulations described a sound shift as a series of individual changes. Fourquet sees a *mutation consonantique* as a general change in the manner of articulation, which affects a regular system and produces a new but equally regular system with the same number of elements. This means that the Neo-Grammarian diachronic method, which treated the developments of the three series as independent events, is replaced by the structural approach, which assumes a common development for all series

that are affected by the same systematic change.

According to Fourquet's theory the Germanic sound shift consists of two stages: (1) a change of correlation of the Indo-European occlusives from sonority to aspiration, (2) the shift proper, which is a general lenition of the consonants involved. Stage one is necessary in order to bring the Indo-European consonant system to a state from which lenition would produce the Germanic consonant system. Thus aspirated tenues were more likely to undergo lenition than pure tenues. Fourquet exemplified this by means of modern Greek lenition, where consonants with weak occlusion, determined by their position within the word and by phonetic characteristics, underwent spirantization more readily than those with stronger occlusion.

A weakness in Fourquet's theory is that he mixes lenition and reinforcement according to the needs of the material. The lenition process as part of the changes from Indo-European to Germanic is illustrated as follows:

	change of correlation		lenition	
IE /p/	/ph/	Proto-Gmc. /f/	Gmc. /f/
/b/	/p/	/ƀ/	/p/
/bh/	/b/	/ƀ/	/b/

Fourquet assumes lenition for all three series, allowing IE /b/ to become Proto-Gmc. /ƀ/ via Pre-Gmc. /p/; he thus will depend on a strengthening process in order to

return to a phoneme /p/ in Germanic, where it must be considered fortis. This reinforcement of articulation Fourquet also sees in the appearance of an allophonic stop pronunciation of the voiced spirants in the Germanic dialects. Gmc. /f/, however, is not affected by the strengthening, and it seems like splitting hairs to argue that since its place of articulation had changed from bilabial to labio-dental, it had thereby dropped out of the system. Since Fourquet's strengthening process is not applicable to all three series, it cannot be viewed as a satisfactory part of his explanation of the sound shift. According to Fourquet, the process of the sound shift extends therefore only as far as the completion of the lenition, leaving the Germanic counterparts of the Indo-European stop consonants at Proto-Gmc. /f þ ƀ/. This does not seem entirely satisfactory. Similar criticism is expressed by R. d'Alquen (1973: 81-82).

Another point, which might lessen the generality of his theory is that it allows for very little resemblance between the Germanic and the High German consonant shifts. The feature both shifts have in common, according to Fourquet, is the evolution of the correlation from sonority to aspiration. All other developments constituting the shifts are to be considered as independent facts. Fourquet even reverses the lenition for the High German consonant shift, in which he sees manifested a general increase of articulatory energy.

In spite of this criticism, the merit of his theory must be acknowledged, which consists both in his systematic approach to the problem and the backing of his theory with facts from acoustic phonetics and other languages.

C. Acoustic Phonetics

The terms 'fortis' and 'lenis' have often been used in the literature to describe sounds in phonemic opposition, when other phonetic dimensions did not suffice. There is, however, widespread reluctance to give fortis-lenis phonemic status, because of disagreement among scholars with regard to a discrete and measurable independent feature embodied in 'fortis-lenis', which is the precondition for such a status. Most often the terms fortis and lenis are associated with consonants characterized by the absence or presence of voice.

While this is true in many cases (for example in the Romance and Slavic languages), there are circumstances in the Germanic languages in which the voice distinction is lost, so that the difference between /b d g/ and /p t k/, for example, has to be something other than voicing. For such cases, in which the phonemic opposition is nevertheless maintained, other phonetic features will have to be called upon in order to express the fundamental distinctive characteristics. Fortis and lenis have been used for this purpose. The acoustic phonetic properties associated with

these terms, however, differ widely, from measures of time to mechanical and articulatory parameters, or combinations of both.

Since scholarly investigations have centred mainly on two parameters, one concerned with mechanical force, and the other with the duration of sounds, our remarks will reflect this basic division of views.

Thus R. Stetson makes a case for pressure difference when he infers from a study of mouth pressure for surds and sonants in rapid speech,

> that the difference in pressure, expressed by the terms 'fortis and lenis' is more fundamental than the voicing of the consonants, and persists after the voicing distinction is lost, i.e., after both surd (fortis) and sonant (lenis) are voiced (Stetson 1951: 50).

This is based on the assumption that the vocal cords do not function independently from the rest of the vocal tract, but that their action is dependent on the intensity of the pulse of air from the chest. Greater air pressure produces /p t k/, whereas the pressure is less for the production of /b d g/; glottal activity is a by-product.

Leigh Lisker agrees with Stetson that the

> stable feature characterizing the /p t k/ - /b d g/ contrast is the pressure difference in the mouth, while the glottal activity called 'voicing' is simply an automatic consequence of a difference between buccal and subglottal pressures during production of /b d g/ (Lisker 1963: 377).

Lisker questions, however, the justification of using the terms fortis and lenis as long as buccal air pressure and glottal activity are not proven to operate independently.

Jakobson, Fant and Halle in *Preliminaries to Speech Analysis* (1969) regard the phonetic dimension of voicing as the redundant accompaniment of a distinctive feature of tension. Tenseness in consonants is manifested by greater duration and by greater strength of explosion in stops. On the sound spectrograms the authors found the sum of deviation of formants from the neutral position to be a measurable entity to distinguish between tense and lax sounds, or more precisely for present purposes, fortis and lenis consonants (Jakobson, Fant, Halle 1969: 36).

K. Ketterer observes in a dialects study on Upper German (1942), that the commonly used term 'voiced mediae' for /b d g/ is incorrect for the description of consonants which possess the same characteristics as their fortis counterparts /p t k/ except for the intensity of the explosive noise. This therefore implies that fortis and lenis are not manifested by a criterion of voice participation, but by one of intensity. Other scholars have observed tension, explosive strength, pressure or force of articulation as manifestation for fortis-lenis.

A. Malécot suggests the force of articulation (i.e. relative amount of muscular energy required to utter a consonant) is the feature which determines whether a consonant is perceived as fortis or lenis. Thus, force of articulation can be defined

> on the basis of the amount of force required of the supraglottal organs to maintain the desired position of the articulators during the 'hold' (Malécot 1955: 40).

He concludes that

> the relative degree of force of articulation is a more fundamental characteristic of the so-called voiced and voiceless consonants than the presence or absence of perceptible glottal excitation during their 'hold' (Malécot 1955: 43).

Malécot confirms these findings in a later article (Malécot 1970: 1592) in which he attributes the force of articulation chiefly to a

> synesthetic response to intrabuccal air-pressure impulse, with closure duration perhaps playing a secondary role (Malécot 1970: 1592).

So far the contributions deal with mechanical force. A number of scholars, on the other hand, have found measure of time to be a more adequate indicator for fortis-lenis. The first linguist to attribute distinctive quality to the length of consonants and therewith to give the first description of a fortis-lenis opposition, is J. Winteler (1876) in his description of a Swiss German consonant system. He writes:

> Bei der Bildung der Fortes verharren die Sprachwerkzeuge fühlbar in ihrer Kulminationsstellung,...diejenigen Artikulationen, welche Lenes erzeugen, (werden) in demselben Augenblicke wieder aufgegeben (...),in welchem sie ihre Kulmination erreicht haben (Winteler 1876: 27).

A mixed approach was taken by E. Fischer-Jørgensen (1963). The results of her experiments on the difference between voiced and voiceless consonants are a combination of the two parameters for fortis-lenis: (1) Voiced consonants

are produced with smaller buccal air pressure than voiceless ones, and (2) voiced consonants are shorter than voiceless ones. A similar idea is expressed by M. Durand (1956), who lists, among other things, the explosive strength and the duration of the consonants as characteristic differences between voiced and voiceless consonants.

Brunner carried out experiments comparing French and Swiss German (Zürich) consonants. He observed that in Zürich German intervocalic fortis consonants following stress are about three times longer than the corresponding lenis consonants in the same position. At the same time there was no difference in voice participation between fortis and lenis. This was in strong contrast to the French consonants where difference in length was negligible, but voice difference was extreme. Brunner assumed tension to be the prominent phonologically relevant feature for Swiss German consonants, with duration considered to be a weak, but nevertheless phonologically correlevant feature, whereas voice is phonologically irrelevant. Comparing his findings from a High Alemannic dialect with those from Low Alemannic dialects, Brunner observed that the duration of fortis consonants decreased gradually as voice participation in the lenis consonants increased.

Another valuable contribution was made by Hentrich (1925) who observed that increased duration of a voiced stop in medial position leads to a decrease in voice participation.

> Sowohl die Anzahl der Stimmlippenschwingungen in der Sekunde als auch ihre Intensität nimmt bei währender Dauer fortschreitend ab. Grad und Ort der Abnahme ist verschieden je nach Idiom und Vp(=Versuchsperson), aber die Tatsache derselben ist allgemein (Hentrich 1925: 23).

This suggests an inverse relationship between voice and duration (tension), which may be taken as an underlying principle in a fortis-lenis definition for Germanic.

It should be noted here, that, although Jakobson, Fant and Halle (1969) emphasize tension as the distinctive feature for fortis-lenis, their definition of tenseness implies a combination of duration and explosive strength.

If a fortis consonant is distinctive from its lenis counterpart by virtue of duration, we may ask then what relationship exists between a single fortis consonant and its geminate counterpart. Experiments with Swiss German consonants and geminates led E. Dieth and R. Brunner (1943) to the following conclusion: a fortis consonant at a syllable boundary is longer than in any other position. It is registered as a geminate consonant if it shows double pressure movement on the spectrum. This means, for Swiss German dialects, that single and geminate fortes do not differ by duration, but by a different distribution of pressure. Therefore a fortis can be either a single or a geminate consonant. To go one step further, affricates are shown by Dieth and Brunner to have the same duration as their intervocalic fortis stop counterparts. Assuming that length is the decisive feature, lenis /b/, for example, is opposed to fortis /p/, /pp/ and /pf/.

Although the parameter 'duration' refers primarily to the consonants for present purposes, vowels are also affected by it. This applies to cases in which the duration of the consonant and of the immediately preceding vowel are interdependent. Dieth and Brunner (1943) state, that the duration of a consonant is determined by the duration of the preceding vowel. As the authors see it, the duration of the consonant determines its intensity and pressure. This allows the conclusion that duration, intensity and pressure of a consonant are directly dependent on the duration of the immediately preceding vowel.

1. Long vowel followed by shorter consonant with less intensity and pressure : lenis consonant, often voiced because of its short duration.
2. Short vowel followed by longer consonant with greater intensity and pressure : fortis consonant, never voiced.[7]

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[7] With regard to the function of the glottis in the contrast between fortis and lenis consonants, Bannert (1976) writes:

> Die grosse Dauer der Fortes führt stets dazu, dass diese Segmente stimmlos manifestiert werden.(p. 73)
> Die Dauer dieser Segmente (including here consonant clusters) ist stets genügend gross, um die Öffnungsbewegung der Glottis bis zum Aufhören der Stimmlippenschwingungen zu vollführen, bevor der folgende Sonorant einsetzt. (p. 74)
> Stimmlosigkeit und grössere Dauer bedingen eine grössere spektrale Intensität, manifestiert als Friktion bei Reibelauten bzw. Explosion bei Verschlusslauten, wodurch der auditive Stärkekontrast zu den Lenes entsteht. (p. 73)
> Da diese Obstruenten (lenes) in dieser Position (after stressed vowel and preceding a sonant) nur eine kurze Dauer aufweisen und die umgebenden Sonoranten mit aneinanderliegenden Stimmlippen

This is in line with R. Bannert's analysis of Middle Bavarian consonant systems (1976), where he introduces the prosodic temporal feature of 'quantity' according to the pattern of complementary length between vowel and following consonant: /long + short/ or /short + long/. Complementary length is prosodic because it comprises two segments.'

A similar observation regarding duration was made by Malécot (1955), who claims that vowels tend to be shorter before fortis consonants and longer before lenis consonants. This, in his words, quoting P. Delattre, reflects the 'psychological anticipation of a greater effort' (p. 38).

Whether vowel length depends on the nature of the following consonant (Malécot), or whether the consonant is determined by the length of the preceding vowel (Dieth and Brunner), is a matter which tends to be decided by the purpose and focus of a particular investigation.

Although many of the above cited elucidations of the problem of fortis-lenis deal with a limited field of

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'(cont'd)gebildet werden, reicht die kurze Bildungsdauer der zugrundeliegenden Obstruenten nicht aus, um die Stimmritze soweit zu öffnen bzw. deren Einstellung dahingehend zu ändern, dass die Schwingungen der Stimmlippen zum Erliegen kommen (p.73).

' This feature of quantity implies through its definition of complementary length, that the shortness of one segment is connected with the length of the following segment and vice versa. Therefore Bannert concludes that fortis and lenis are not independent entities and thereby refutes fortis-lenis as distinctive feature.

language, because of their being restricted to certain dialects, or because of the relatively small scope of the acoustic-phonetic experiments, they nevertheless allow the generalization that voice is non-distinctive in Germanic languages, thus favouring a distinction which is most adequately described as fortis-lenis. This feature has not been defined to anyone's complete satisfaction. It seems likely, however, that this opposition consists of temporal and mechano-physiological subfeatures. There seems to be general agreement for Germanic languages and dialects that the action of the vocal cords is either predictable and therefore subphonemic, or not present at all. This leads to the hypothesis, which is to be tested in the following chapters, that voiced-voiceless, usually assumed as primary opposition for Germanic,* should be replaced by fortis-lenis. The hypothesis stands or falls on its ability to explain better the development of Germanic into the various dialects.

D. Theory

The fortis-lenis concept first came to mind as an ad-hoc adjustment to a seemingly inconsistent development found in Jean Fourquet's brilliant monograph on the two sound shifts (Fourquet 1949). According to Fourquet the first step in the Germanic sound shift consisted in a change

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* See Moulton 1954.

of correlation in the phonemic structure of the Indo-European consonants. The correlation of voice was replaced by a correlation of aspiration.'[10] Step two consisted in a general lenition process operating on all obstruents of the system after step one had taken place. Since it appears, however, that not all three series of obstruents exhibit features due to lenition after completion of step one and two, but only two of them, the development of the third series would better be described as having undergone strengthening:

1. IE p > ph > Proto-Gmc. f
2. IE bh > bh > Proto-Gmc. b
3. IE b > b/p > Proto-Gmc. p

We seem to have a realignment of the Pre-Germanic phonemic structure to incorporate a fortis-lenis opposition in Germanic. This ad-hoc adjustment of Fourquet's scheme was adopted to allow for a distinctive feature opposition fortis-lenis underlying the Germanic obstruent system.

Fourquet's scheme modified for a fortis-lenis opposition illustrated with the labial order of consonants:

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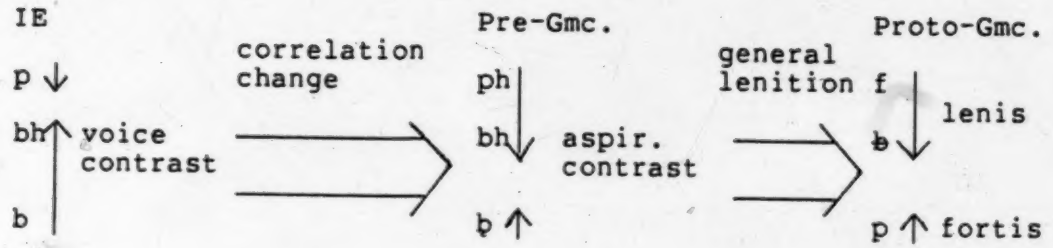
[10] This idea was first expressed by A. Meillet (1917), who based it on a comparison with Armenian. Fourquet compares the Armenian case with developments observed in the modern Germanic languages.



Examples illustrating the Germanic sound shift:

IE /p/ > Gmc. /f/: Lat. *pes, pedis*
Go. *fôtus*
MnE *foot*
NHG *Fuss*

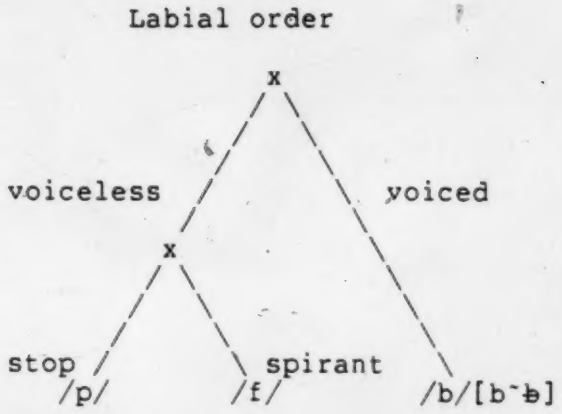
IE /bh/ > Gmc. /b/: Skt. *bheran*
Go. *bairan*
OHG *beran*
ON *bera*

IE /b/ > Gmc. /p/: Lat. *cannabis*
OS *hanap*
ON *hampr*
OHG *hanaf*
MnE *hemp.*

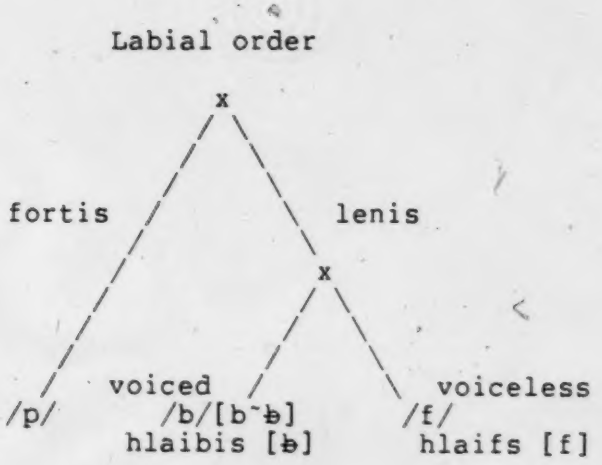
The concept of fortis-lenis may be strengthened by reinterpreting W.G. Moulton's excellent study of Germanic consonants (1954). In this article the author attempts to analyse the Proto-Germanic consonant system through the use of structural methods and also 'by a more strict application of the principles of the comparative method' (Moulton 1954:

3). Based on twelve environments significant for his investigation, Moulton examines every consonantal order as they appear in the documents of the Germanic dialects. He analyses the stops and spirants of the oldest dialects, that is Gothic, Runic Norse, Old Icelandic, Old English, Old Saxon, Old High German, and determines the structural changes which brought about each of these systems. Having obtained the structures of the individual Germanic languages, he then uses the comparative method to reconstruct the stops and spirants of the proto-language. From the analysis he assumes a labial, a dental and a velar order for Proto-Germanic; there is also a glottal order to account for initial /h/ as an innovation.

His analysis shows the following structure for the stops and spirants of Proto-Germanic: (p : f) : b, (t : þ) : d, (k : x) : g, h, s : z. The primary distinction is voice, the secondary one is occlusion. Applied to Gothic, for example, this structure can be illustrated by a tree diagram (for the sake of convenience the labials are to represent all orders):



This representation, however, does not do full justice to the state of affairs when it comes to dealing with examples such as Gothic nom.sg. *hlaifs* 'bread', and gen.sg. *hlaibis*, where morphophonemic alternation implies an earlier state in which the final phoneme of *hlaif* was identical to the antepenultimate phoneme in *hlaibis* i.e. Gmc. **hlaiƀ-*. Thus Gmc. /b/ split conditionally into /f/ and /b/. Most likely the lenis quality of Gmc. /b/ persisted in both /f/ and /b/, since only loss of voice was involved. This close phonetic relationship between Go. /f/ and /b/ should be reflected in the diagram by closeness in the tree. The situation is the same in the dental order, as can be found in examples like Go.nom.sg. *haubiþ* 'head' and gen.sg. *haubidis*. If instead of a primary distinction of voice we assume a fortis-lenis distinction and voice as the secondary distinction, the resulting new tree-diagram represents the structural relationship more accurately:



For a more detailed treatment of this particular problem see the chapter on Gothic.

Moulton's analysis of the Old High German consonant system, however, is not based on a primary distinction of voice, as is the case with all other Germanic dialects, but on a fortis-lenis contrast. Moulton first sets up a Pre-Old High German structure, in which occlusion figures as the primary distinctive feature and voice as the secondary one: (p : b) : f, (t : d) : þ, (k : g) : x. Three major structural changes followed: (1) The development of aspiration of /p t k/ contrasting with /b d g/, which consequently lost their sonority, (2) the geminate stops /bb dd gg/ becoming fortis stops, (3) the aspirates /p' t' k'/ becoming affricates and spirants. These changes led to a completely new structure. Rather than analysing this new structure in terms of a voice and/or occlusion distinction, Moulton assumes a distinctive feature of tenseness opposing OHG fortis /p t k f s/ to OHG lenis /b d g v z/. /ʒ x/ are

fortis, /h/ is lenis, without opposing counterparts. The Old High German affricates /pf tz kx/ are analysed as consonant clusters.

In a later article (1969), Moulton gives a more detailed analysis of the rather complex development of the Old High German phonology. Special attention is given again to the fortis-lenis contrast, which, however, is projected into late Middle High German as being removed by the so called *binnenhochdeutsche Konsonantenschwächung* (Moulton 1969: 258).

Moulton's fortis-lenis interpretation of the Old High German consonant system is not unique.'' Clearly, the distinctive features employed in setting up the consonant systems of periods prior to Old High German, namely voice and occlusion, were not applicable when it came to the Second Sound Shift and its results. The fortis-lenis interpretation appeared therefore to be the obvious structuralist solution when dealing with the development of a system which finally was to consist of affricates, geminates, stops and fricatives of different degree of tenseness.

At this point the question must be raised, whether any attempts have been made to apply the principle of a fortis-lenis contrast as primary distinctive feature to periods of Germanic other than Old High German. Such an

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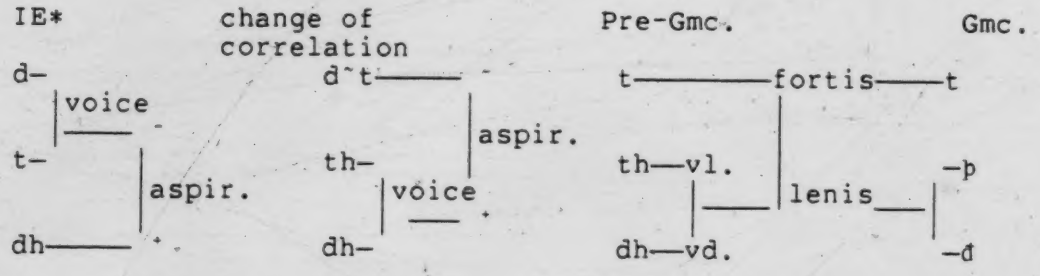
'' See for example Penzl 1956, 1960, 1968; Valentin 1962; Simmel 1974: 377.

attempt has indeed been made by R. d'Alquen in the above mentioned article (d'Alquen 1973). The author proposes a fortis-lenis opposition as early as the Pre-Germanic stage, when a change in correlation replaced voice with aspiration. [12] This process is illustrated in the following table:



*Voice and aspiration are to be taken here as correlations of equal status.

Contrary to Fourquet who assumed general lenition for all Pre-Germanic stops, d'Alquen suggests

> to consider Pre-Gmc. /t/ unaffected by lenition. This implies that Gmc. /t/ is fortis in relation to Gmc. /þ/ and /đ/. Since the development of the Germanic spirants is held due to lenition, we might project the contrast back and consider Pre-Gmc. /t/ fortis and Pre-Gmc. /th/ and /d/ lenis (1973: 82).

I shall illustrate the possibility of a fortis-lenis hypothesis with a number of examples reflecting a fortis-lenis contrast, following d'Alquen (1973):

1. The change of IE /d/ to Gmc. /t/ is primarily an intensification of articulation.

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[12] See Fourquet 1949.

2. If voice is accepted as lenis characteristic, the retention of voice in IE /dh/ to Gmc. /đ/, and the voicing of the reflexes of IE /t/ in Germanic under conditions of Verner's law, imply lenis articulation.
3. The further development from Germanic into Old High German suggests a continued effect of a fortis-lenis contrast as indicated in contrasting pairs such as OHG /ʒ/ : /s/ < Gmc. /t/ : /s/ as in *(h)waz* 'what' : *was* 'was' (3rd sg.p.t.), where /ʒ/ is seen as being fortis and /s/ as being lenis. The lenis member /s/ becomes voiced under conditions of Verner's Law: **wêsúm* > **wêzum* > OHG *wârum* 'were', a circumstance which is characteristic of lenis articulation. The same is true for OHG fortis /f'/ and /h'/ < Gmc. /p/ and /k/ as opposed to OHG lenis /f/ and /h/ < Gmc. /f/ and /x/.
4. Supposing that IE /t/ led to a lenis phoneme /þ/ in Germanic, which continued as lenis component into Old High German, then IE /st/ must follow the same trend: indeed, the reflexes of IE /st/ retain a lenis, voiceless unaspirated stop in the modern Germanic languages (Lat. *stella*, MnE *star*, NHG *Stern*), whereas the reflexes of IE /đ/, (Lat. *dentis* 'tooth'), which became a fortis stop in Pre-Germanic, are still fortis, i.e. voiceless and aspirated as in MnE *tooth*, and voiceless and affricated as in NHG *Zahn*.
5. Reflexes of Gmc. /p t k/ in Old High German are represented often by two or even three orthographic

symbols each, e.g. OHG *uuipphe* (Otfrid), *ezzan*, *buohheri* (Tatian). We take this as implying increased duration, which is strong indication of fortis quality.

6. Increased duration is also the decisive factor for lenis Germanic geminate consonants to become fortis in Old High German: OS *kribbia* - OHG *crippea*, *krippha*.

The hypothesis to be tested is, that voice as primary correlation, largely assumed for Germanic[13] can be replaced by a more explanatory fortis-lenis opposition.

I therefore propose in this dissertation to test the applicability of fortis-lenis to the development of the Germanic languages from the reconstructed stages into the modern period. Its validity will be tested from various angles by calling upon the linguistic disciplines of acoustic phonetics, historical comparative linguistics and modern dialect geography. The approach of this undertaking is still basically structural, but it tries by reference to acoustic phonetics to avoid unrealistic abstraction. In other words, this is an attempt to introduce scientific findings in support of the theory. It is hoped that this study will be able to supply a uniform explanation of the two consonant shifts as well as a common formulation for the development of consonants in the several Germanic languages.

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[13] See Moulton 1954.

II. GOTHIC EVIDENCE

A. Introduction

Before dealing with the structures of the individual Germanic languages we must recall the hypothesis which has been stated earlier: that the phonemic opposition of the consonant system, which is generally agreed to be based on voice in Pre-Germanic, is assumed to become a fortis-lenis opposition in Proto-Germanic, or more precisely, that a fortis-lenis opposition is the result of the Germanic consonant shift.

Therefore, in order to verify fortis-lenis as the primary distinctive feature underlying the Proto-Germanic consonant system, we must rely on the evidence of the recorded Germanic languages, to which we shall turn our attention now.

Our earliest extensive records of Germanic are in Gothic. To be sure, there are some Runic inscriptions which can be dated somewhat earlier. They are, however, scanty and fragmentary and therefore insufficient for detailed phonological analysis. They will be dealt with together with the Old Norse evidence, to which most of them belong. The source for Gothic is the fourth century Bible translation by the Visigothic bishop Wulfila, preserved in a number of manuscripts, of which the *Codex Argenteus* and the *Codices Ambrosiani* are the most extensive. Wulfila is responsible not only for translating the Bible from Greek into the

language of his people, but also for the invention of a new writing system. If the evidence of Bible Gothic orthography is judged on comparative and historical criteria, it appears ambiguous or inconsistent in a number of cases (e.g., *u* is used for the reflex of both long Gmc. /u:/ and short Gmc. /u/, but the length distinction between *ei* for Gmc. /i:/ and *i* for Gmc. /e/ and /i/ is expressed). The Gothic system of spelling alone indicates consistent phonemic contrasts, but no subphonemic variations; thus we can draw no conclusions about narrowly specified sound values or allophones, and there is a risk that we are confusing graphemic and phonemic contrasts. W.H. Bennett takes a compromising stand in the unresolved question of reconciling the orthography of Gothic and the historical comparative evidence relevant to the sounds of Bible Gothic:

> Both the etymological and the phonemic analyses of Gothic spelling are useful and valid. One provides a broad perspective, one a specific insight, but neither is a substitute for the other.[1]

Handbooks dealing with the sounds of Gothic[2] usually do this in the neogrammarian fashion: the sounds are listed in view of their relationship to the corresponding Germanic or Indo-European sounds either according to manner of articulation (e.g. 'Voiced Spirants') or according to place of articulation (e.g. 'Labials'). Although works of

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[1] Bennett 1964: 26.

[2] Representative sampling: Streitberg 1897 (5/6th ed. 1920); Kieckers 1928 (reprint 1960); Wright 1954 (reprint 1966); Braune/Ebbinghaus 1966; Krause 1968.

structuralists may be mentioned,[3] strictly structural principles are not applied to the presentation of sounds.

The dangers of a strictly orthographic approach are illustrated by J.W. Marchand's doctoral dissertation of 1955 dealing with the sounds and phonemes of Wulfila's Gothic, which was published in 1973. It consists mainly of a thorough application of a working hypothesis to the sound system of Gothic, a treatment of problems 'in terms of method rather than result' (1973: 108). Therefore his conclusions need not all be taken at face value, such as, for example, Wulfila's alphabet being phonemic to the extent that 'each sign stands for one and only one phoneme' (1973: 102). This assumption was met with criticism, in particular with regard to the vowels and diphthongs. In as far as Marchand's phonemic view concerns the consonant system, it does not, on the whole, run counter to views held by other scholars.

W.G. Moulton's work in this field shows greater balance (Moulton 1948; 1954; 1972). His analysis of the Proto-Germanic stops and spirants is based on the combined use of structural methods applied to the consonants of the oldest Germanic dialects, and of 'a more strict application of the principles of the comparative method' (1954: 3), in order to reconstruct the stops and spirants of Proto-Germanic. Moulton's balanced approach may be the

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[3] E.g. Krause (1968: §102-102a), where he makes reference to Fourquet's theory.

reason for the wide acceptance of his views. The results of his analyses will, therefore, form the starting point for the present investigation of Gothic phonology.

W.H. Bennett (1964) and H. Penzl (1950) deal independently with the question of the relation between Wulfila's orthography and the phonemic structure of his language. Both came to the conclusion that Wulfila's spelling system indicates phonemic contrast without any evidence for subphonemic variation except for the representation of [ŋ]/n/ before velar stops.

Marchand (1973: 60) points out that there are two types of phonemic opposition: (1) the opposition of two contrasting sounds as represented in minimal pairs, and (2) the opposition expressed in distinctive features pertaining to entire subsystems of a language. It will become clear, that while we depend heavily on Moulton for information on the first type of opposition, we take issue with him in the second, for instead of Moulton's opposition based on voice we substitute one based on strength of articulation, namely fortis-lenis, as the primary contrast in the consonant system of Germanic.

B. Phonemic Analysis of the Gothic consonants

Since this investigation is concerned chiefly with the stops and spirants of Germanic and possible clusters

thereof, *m, n, l, r, j, w* need not be mentioned.[4] For the remaining consonants Moulton distinguishes basically three orders for the stops and spirants: labial, dental and velar. These are complemented as a result of the analysis by a glottal order for /h/, and an alveolar order for /s/ and /z/. The structural evidence is based on twelve different environments: 1. initially, 2. in gemination, 3. after nasal before vowel, 4. after nasal finally, 5. after *l* before vowel, 6. after *l* finally, 7. after *r* before vowel, 8. after *r* finally, 9. after vowel before vowel, 10. after vowel finally, 11. after vowel before *s*, 12. after vowel before *t*.

Labials

/p/ *p* occurs in initial, medial and final position: *pugg* 'Geldbeutel',[5] *wairpan* 'werfen', *greipan* 'greifen', *graip, -halp* 'helped'. Its phonetic value as a voiceless stop seems guaranteed by the spelling of Greek loan words, e.g. *praufetus, filippus*.

/f/ The voiceless spirant occurs as *f* in initial, medial and final position: *fadar* 'father', *fimf* 'five', *wulfos* 'wolves', *-hofun, -hof* 'heben'(past tense), *gaf* 'gave', *hlaifs* 'bread'. Its phonetic value is confirmed by the spelling of Greek loan words: *praufetus, filippus*.

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[4] This applies also to the analyses in the following chapters.

[5] The examples are from Moulton (1954) and Feist (1909), unless quoted otherwise.

/b/ *b* transcribes Greek *β*, which was a phoneme with both stop and spirant allophones in the Greek of Wulfula's time. This appears to be the case for Gothic as well. The distribution of the Gothic stop and spirant allophones is ascertained through internal evidence as follows: 1. Postvocalic *b* before vowel is considered a voiced spirant, which becomes voiceless before *s*, *t*, and in final position: *giban* [ƀ] 'give', dat. *hlaiba* [ƀ] 'bread', nom. *hlaifs* [f], acc. *hlaif* [f], *gaft* [f] 'gavest', *gaf* [f] 'gave'. This alternation of *b* = /b/ with *f* = /f/ is taken as evidence for voiced spirantal allophone between vowels: *giban* /giban/ [giƀan]. 2. Postconsonantal *b* is considered a stop allophone, since it does not alternate with *f*: *lamba* 'lambs', *dumbs* 'dumb', *biswarb* 'wiped', *gabaurbs* 'temperate', *silba* 'self'. The fact that postconsonantal *b* contrasts with *p* indicates that it was voiced: *-warp* : *-swarb*, *-tramp* : *lamb*. 3. Initial *b* as in *baurgs* 'Stadt', *beitan* 'bite', is considered a stop, as can be deduced from the spelling of Gothic names in Latin documents.[4] 4. There is not much evidence for geminate *b* except for loan words such as *sabbato* 'sabbath'. Moulton therefore assumes *bb* to represent a long voiced stop as in Greek.

After the phonemic analysis Moulton assigns distinctive features to the three phonemes /p/ /f/ /b/. Using the foregoing analysis, Moulton makes voice the primary

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[4] See Moulton 1954: 4-5.

distinctive feature, which contrasts /p/ and /f/ with /b/. The secondary distinctive feature is occlusion, which distinguishes /p/ from /f/. These relations are symbolized as (p : f) : b. The opposition of voice between /b/ and /f/ is, however, subject to neutralization under certain conditions. Thus Moulton states that the automatic alternation between /b/ and /f/ indicates a suspension of the opposition of voice in postvocalic spirants before *s*, *t*, and in final position (Moulton 1954: 5). The system based on a primary contrast of voice and a secondary one of occlusion is subject to disruptions and inconsistencies which will be described later. It is the aim of this chapter to test an alternative system.

Instead of voice we propose to assign an opposition of fortis-lenis to consonants as the primary distinctive feature. This results in fortis /p/ contrasting with lenis /b/ and /f/. There also exists a secondary distinction of voice between /b/ and /f/. /p/ is considered fortis because of its phonetic characteristics of voicelessness and consistent occlusion. /b/ is lenis because of its voicing and its spirantal allophone. /f/ is considered lenis because it alternates with lenis /b/ in such cases as *hlaifs - hlaibis.*[1]

One advantage of a fortis-lenis opposition over Moulton's analysis consists in a reduction of the disruption implied by morphophonemic alternation. In Moulton's

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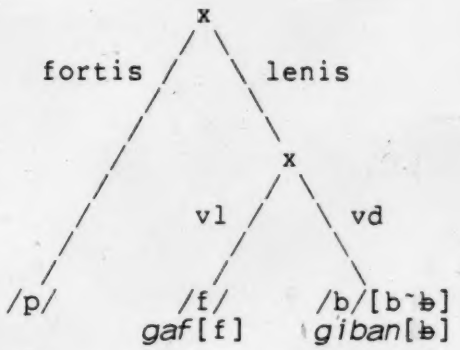
[1] Cf. Chapter I. part C. 'Acoustic Phonetics'.

solution, the automatic alternation between /b/ and /f/ implies that the primary distinction of voice was lost in certain environments due to linguistic change. With fortis-lenis as primary opposition, to be sure, voice is also suspended by the automatic alternation of /b/ and /f/. Here, however, voice contrast is only secondary, which means that its neutralization took place at a lower level because of the same linguistic change. It is intrinsically preferable that a change should affect a system at a low level before it affects it at a higher level.

This can also be viewed from a different angle. Since the morphophonemic alternation as in *giban* [ƀ] and *gaf* [f] implies a rather close relationship between /b/ and /f/, it makes sense in a structural analysis to group the two phonemes together rather than to separate them; that is to conceive of /b/ and /f/ as lenis phonemes contrasting with fortis /p/, rather than to list /p/ and /f/ together by virtue of their being voiceless. The structure of the labial order of consonants as viewed by Moulton compared with the structure suggested above can be illustrated on tree diagrams as follows:

Moulton's primary contrast of voice

Suggested primary contrast fortis-lenis



It is evident from this illustration that fortis-lenis must be given preference where simplicity of morphophonemic alternation is judged decisive.

Another vulnerable point in Moulton's analysis is the following: the secondary distinctive feature between /p/ and /f/ is occlusion. Yet occlusion is also the allophonic distinction between the positional variants [b] and [ɓ] of the phoneme /b/.[8] A phonemic distinction ought not to be allophonic within the same order, if an analysis exists in which the blemish can be cured, as is the case with a primary fortis-lenis contrast (fortis /p/ against lenis /b/ and /f/) and a secondary contrast between /b/ and /f/ based on voice, leaving the occlusion in /b/ [b ~ ɓ] as

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[8] Moulton comments on this as a matter of fact, which does not imply admission of a shortcoming:

> ...(The obstruents) showed a primary opposition Voiceless ≠ Voiced,...a secondary opposition Stop ≠ Fricative which was phonemic among the voiceless obstruents,... but allophonic among the voiced obstruents. (Moulton 1972: 143)

allophonic. This can be demonstrated graphically by comparing the tree diagrams above.

Dentals

/t/ *t* occurs in all positions: *tuggo* 'tongue', *skattans* 'money', *wintrus* 'winter', *salt* 'salt', *haitan* 'heissen'. We assume it to be a voiceless stop, which is in contrast with the spirant /þ/ and the voiced obstruent /d/.

/þ/ It occurs as *þ* in all positions: *þank* 'thank', *aiþþau* 'or', *munþa* 'mouth', *gulþa* 'gold', *qiþan* 'sagen', *qaþ* 'sagte', *bleiþs* 'mitleidig', *bauþ* 'offered', *staþs* 'place'.

/d/ It occurs as *d* and is assumed to be a voiced stop initially, in gemination, and in postconsonantal position: *dags* 'day', *twaddje* gen. of *twai* 'two', *landa*, *land* 'land', *waurda*, *waurd* 'word', *skulda*, *skuld* 'owing'. Postvocalically *d* alternates with *þ* in final position and when followed by voiceless consonants. *anabiudiþ* 'orders', *anabauþ* 'ordered'; dat. *stada* 'place', nom. *staþs*, acc. *staþ* 'place'. This alternation allows the conclusion that postvocalic *d* is a voiced spirant, which becomes unvoiced finally and before *s*. Lack of alternation between postconsonantal *d* and *þ* is taken as evidence for stop pronunciation, parallel to the labial order (acc. *land* 'land', *frijonds* 'friend',

neut. *skuld* and masc. *skulds* 'owing', *waurd* 'word', *ubilwaurds* 'evilspeaking'). Go. /đ/ is assumed parallel to /b/ and therefore a stop initially. There is no evidence for the pronunciation of the geminate *dd*, which therefore by analogy alone is assumed to be a geminate voiced stop.

In Moulton's analysis we have a three-way contrast between a voiceless stop /t/, a voiceless spirant /þ/, and a voiced obstruent /d/ with stop and spirantal allophones. Since both the labial and the dental orders show the same phonemic contrast, the same structure within the order is to be expected: the primary feature of voice distinguishes /d/ from /t/ and /þ/, whereas /t/ and /þ/ contrast by the distinctive feature of occlusion.

In contrast with Moulton's analysis we propose the following: t : (d : þ), where /t/ is the fortis, and /d/ and /þ/ the lenis members. The reason for this choice lies again in preventing the morphophonemic alternation from disrupting the primary contrast. We confine the morphophonemic alternation to the lenis side. The criticism regarding the dual function of a major distinction on the phonemic and allophonic level in the labial order applies equally to the dental order.

In his study of the sounds of Gothic, J.W. Marchand looks at the problem of distinctive feature analysis from various angles and concludes that 'if we accept the spirant allophones of /b/ (and /đ/), we must accept Moulton's

conclusions' (Marchand 1973: 62). Since for the present purpose we accept the view of spirantal and stop allophones for /b/ and /d/, our solution based on a fortis-lenis contrast proves that we disagree with Marchand. Not only is the proposed fortis-lenis opposition a valid alternative to Moulton's analysis, it claims to be the better solution.

Velar and Glottal Order

A three-way contrast in a number of environments confirms that there are three separate phonemes /k/ /g/ /h/.

/k/ It occurs as *k* in all positions and is assumed to be a voiceless stop: *kaurn* 'grain', *smakkans* 'figs', *drigkan* 'to drink', *dragk* 'drank', *skalk*, *skalkos* 'Knecht', *waurkeiþ* 'wirkt', *-aukan* 'to increase', *auk* 'but', *reiks* 'Herrscher'.

/g/ It occurs as *g* in all positions: *gasts* 'guest', *triggws* 'treu', *lagga*, *lagg* 'long', *balgeis*, *balg* nom.pl and acc.sg. 'Schlauch', *baurg*, *baurge* 'Stadt', *dagos*, *dag*, *dags* 'day', *magt* 'canst'. We assume a voiced spirant [ɣ] for postvocalic *g*, which becomes devoiced [x] in voiceless environment, and a voiced stop [g] elsewhere.

/h/ It occurs as *h* in all positions except in gemination and in position after nasal: *haurn* 'horn', *filhan* 'verbergen', *þairh* 'through', *slaha* 'schlagen', *slah* 'stroke', *ahs* 'Ähre'. *maht* 'might'. It appears from considerations below that /h/ was a glottal spirant.

From the following observations it becomes evident that /k/ /g/ /h/ are different from the labials and dentals. The phonological relationship between /g/ and /h/ is not the same as that between /b/ and /f/, or between /d/ and /þ/: postvocalic *g* does not alternate with *h* in positions before *s*, *t*, and finally; rather they are in contrast with each other: acc. *dag* - acc. *slah*, nom. *dags* - *ahs*, *magt* 'canst' - acc. *maht* 'might'. Moulton therefore concludes that 'postvocalic /g/ cannot have been the voiced counterpart of /h/' (1954: 6). This is followed by his argument for postvocalic *g* being a spirant and not a stop in analogy with postvocalic /b/ and /d/, and that *h* could not have been a palato-velar spirant, but was a glottal spirant. The evidence for the latter is based on Gothic *h* transcribing the Greek rough breathing and the fact that it alternates with zero and is subject to extensive assimilation.

If we accept Moulton's reasoning - and there is no reason why we should not - /h/ is a glottal spirant which does not share the distinctive feature velar with /k/ and /g/. /k/ is assumed to be a voiceless stop in all positions. /g/ is a voiced obstruent with stop and spirantal allophones. The evidence for the distribution of the allophones of /g/ is found in analogy with the labial and dental orders: /g/ represents a voiced stop [g] initially, in gemination, and after consonants; a voiced spirant [ɣ] intervocalically, which is devoiced to [x] before *s*, *t* and in final position.

Moulton's structural analysis based on a primary distinctive feature of voice contrasting /k/ with /g/ suffers from a slight inaccuracy: /g/ being on the voiced side has a voiceless allophone [x] postvocalically before *s*, *t*, and finally. Also, similar to the argument brought forth with the labials and dentals, voice serving as primary distinctive feature appears inconsistently also on the allophonic level in /g/[ɡ ~ x]. Viewed with fortis-lenis as the primary distinctive feature, a dual function of the phonemic distinction is avoided: fortis /k/ contrasts with lenis /g/, leaving the distinctions of occlusion and voice for the allophonic level: [g ~ ɡ], [ɡ ~ x]. Glottal /h/ is not formally linked with either fortis or lenis. However, its tendency to alternate with zero shows /h/ to be lenis in character.

There is also another set of spirants, /s/ and /z/, which contrast by voice intervocalically and stand in similar morphophonemic relationship as /b/ and /f/, or /d/ and /þ/ in final position and before *t*: *wasuh* 'and was' vs. *hwazuh* 'each'; but *was* 'was', *hwas* 'who'; *laiseiþ* 'teacher' vs. *maiza* 'more'; but *lais* 'know', *mais* 'more', *laistjan* 'follow', *maist* 'most'. /z/ is, however, considered a marginal phoneme, since its occurrence is restricted to voiced environment, and there are only very few examples in which /z/ and /s/ contrast intervocalically. It is also

found in free variation: *saislêp - gasaizlêp* 'slept'.' Its functional load is therefore exceedingly small. Within the proposed system, both /s/ and /z/ are considered lenis: /z/ because it is a voiced spirant and /s/ because it alternates with /z/. There is no fortis counterpart.

Table of Gothic consonants

	phonemes	allophonic distribution initial	medial	final
fortis	/p/	p-	-p-	-p
	/t/	t-	-t-	-t
	/k/	k-	-k-	-k
lenis	/b/	b-	-Cb-, -V~~þ~~-	
	/d/	d-	-Cd-, -V~~đ~~-	
	/g/	g-	-Cg-, -V~~ɣ~~-	-x
	/f/	f-	-f-	-f
	/þ/	þ-	-þ-	-þ
	/s/	s-	-s-	-s
	/z/		-z-	
	/h/	h-	-h-	-h

C. Höfler's Evidence in Support of Fortis-Lenis

A contribution by O. Höfler (1957; 1958) supplies us further with material in support of our fortis-lenis theory. According to Höfler, numerous examples point to the fact that the Second Sound Shift is not confined to High German and Langobardic, but appears also in Gothic, Vandalic and Burgundian, albeit in an incomplete fashion.

' For more on the distribution of /s/ and /z/ see Braune/Ebbinghaus 1966: §§76-78.

The Second Sound Shift, often referred to as the High German Sound Shift, can be described as the Germanic mediae shifting to tenues, and the Germanic tenues undergoing spirantization or affrication. Evidence for these two sound changes (*Medienverhärtung* and *Tenuesverschiebung*) has been found by Höfler in Gothic (Vandalic and Burgundian). Although the shifts are carried out only incompletely when compared with the results in High German, the occurrences are frequent enough to constitute significant evidence for the Second Sound Shift having taken place in East Germanic.

The evidence is adduced from (1) Portuguese and Spanish names of persons and places, (2) personal names in late Gothic history, (3) items from Busbecq's Crimean Gothic word list from the 16th century, (4) Vandalic inscriptions and historical personal names in North Africa, (5) Burgundian place names.

The following shows to what extent the East Germanic dialects participated in the Second Sound Shift as revealed by the evidence. I. Shift of Germanic mediae to tenues in Visigothic, Ostrogothic, Crimean Gothic, and also possible traces in Vandalic and Burgundian. II. Shift of Germanic tenues to affricates in Ostrogothic, Vandalic and Visigothic.'[*]

'[*] Only a few examples will be cited out of Höfler's extensive collection of evidence.

I. Shift of Mediae

Late Visigothic *t* for/or alongside Gmc. /d/:

Ataulfus - Adaulfus

Contomil - Gondomil

Itila - Idila

Late Visigothic *k(c)* for Gmc. /g/:

Caide - Gaido

Contius - Gontiniz

Ikila, Iquila - Egila

Late Visigothic *p* for Gmc. /b/:

Pervisenda - Berosendi, Berosenda

Perelio - Beril(l)i

Ostrogothic *t* for Gmc. /d/:

Witigis - Vidimer (Jordanes 5th century)

Witisclus - Vidisclus (Visigothic version)

Crimean Gothic:

plut 'blood'

thurn 'door', *tag* (twice) 'day'

criten 'to cry' (Wulfil. *gretan*)

II. Shift of Tenues

Only the dental order seems affected. Thus the examples show late Gothic *z tz* for Gmc. /t/

Ostrogothic:

Tzalico (557 A.D. Ravenna) - Lgb. *Tiallo* (801 A.D.)

OHG *Zallo*

Zalla, Tzalla (name of an Ostrogoth in the reign of

Totila)

Zeja (dat. *Zejae*) (name in a papal letter 494/95) -

Teie (dat., name in an earlier letter of the same pope)

Tzitta, Tzita - OE *Tida*, Lgb. *Zita*

Tsutzar (508 A.D.) cf. etymon *tot-* 'Haar' *Totila*? -

ON *Toti*, *Tottr*, OHG *zotta*

Baza, Patza, Pitza, Petza, Pitzia - surnames

Late Visigothic evidence in Portuguese names:

Baza, Patza - names of persons

Ginzo, Genço - place names

Vandalic:

Jul(ius) Tzaiza - ON *Teitr*

(epitaph in Algeria) Lgb. *Zeiso*, OHG *Zeizo*

Tzatzon 'longhair'? - Ostrogothic *Tata*, Lgb. *Tato*

Ital. *zazza* 'Haarbüschel'

Stotzas (Jordanes, Prokop) - *Stutias* (Corrippus)

MHG *stotze* 'Klotz'

Genzon (Prokop) - *Genton* (son of Geiserich)''

Höfler's contribution provoked mixed reaction.'[12] Aside from acceptance or refusal of his *Entfaltungstheorie*, for which the Second Sound Shift in Late East Germanic was to be the major supporting evidence, criticism centred mainly on

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'' All the examples are from Höfler 1957. His main sources are the collections by Meyer-Lübke, G. Sachs, Gamillscheg, A.A. Cortesão, J.M. Piel. For detailed bibliographical references see Höfler 1957: 296.

[12] Cf. Sonderegger 1959; Mitzka 1959; Lane 1959; Marchand 1960; Fourquet 1960.

his choice of exclusively onomastic material, and the likelihood of sound substitution.

We cannot ignore scholars who refute the shift of the Germanic mediae as suggested by Höfler, because orthographic alternations between *p t k* and *b d g* 'spiegeln einfach vulgärlateinische Schreib- bzw. Lautgewohnheiten wieder' (Marchand 1960: 208). We also agree with Marchand that conclusions based on a collection of onomastic material from different periods and places need verification from other sources, which is lacking in Höfler's work.

With these shortcomings in mind we are nevertheless inclined to consider the material above as possible supporting evidence for the proposed fortis-lenis theory.

From the examples listed by Höfler we get late Gothic spellings *b/p, d/t, g/k* for Germanic lenis /b d g/. As we have seen above,[13] voice might be non-distinctive, while force of articulation expressed in duration represents the primary acoustic phonetic parameter of the fortis-lenis contrast. The change *b* > *p*, while implying loss of voice, does not indicate an increase in duration. Both factors, namely alternation between voiced and voiceless, and short duration, are typical of lenis.

The late Gothic spellings *z tz* for fortis Gmc. /t/ represent in all likelihood an affricate [ts] which implies a lengthened sound if compared with former /t/. This agrees with our assumption that increased duration combined with

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[13] Cf. Chapter I. part C. 'Acoustic Phonetics'.

the absence of voice is typical for fortis. If we assume, according to our hypothesis, that Gmc. /t/ contrasts with Gmc. /d/ by a primary contrast of fortis-lenis, we imply by definition that the phonetic reality of /t/ is longer in duration than the phonetic reality of /d/. Applied to Höfler's late Gothic evidence this means that the increased duration found in late Gothic *z tz* is due to the fortis characteristic of former Gmc. /t/.

Owing to a lack of adequate material the evidence of late Gothic cannot be viewed as strong support for a fortis-lenis contrast. However, if considered parallel to the more complete process in High German, the late Gothic evidence of the fortis dental can be placed beside OHG *z(z)*, and late Gothic *b˜p, d˜t, g˜k* beside Upper German *p t k* for Gmc. /b d g/. The significance of the lengthened former dental stop in the spellings collected by Höfler consists in indicating a continued effect of the fortis-lenis contrast in the development of the Germanic languages. Indications of *t-* affrication and lengthening in late Gothic as well as in High German strengthen the case for fortis stops in Germanic, just as the indications of maintained short duration by Gmc. /b d g/ is quite in keeping with our claim that they are lenis.

D. Conclusion

In conclusion it can be stated that the examination of the Gothic consonants speaks for the validity of our hypothesis, in which a primary phonemic contrast between fortis and lenis is assumed for Germanic instead of one based on voice. Additional support was brought about by late Gothic evidence which indicated further development of the Gothic consonants in line with our assumption.

III. OLD HIGH GERMAN

A. Introduction

In the previous chapter we examined the Gothic consonant system in order to test the validity of the fortis-lenis hypothesis. The result was that the evidence from Gothic offers support. Since the structure for the consonants of Gothic is reasonably close to that of reconstructed Proto-Germanic,[1] we made so bold as to generalize by saying that the fortis-lenis opposition was present in Proto-Germanic reaching back as far as the Germanic consonant shift, which was found to be its origin. The validity of our hypothesis[2] will now come under test through an examination of the changes that the consonant system undergoes in the course of the High German consonant shift. The impact of this Second Sound Shift on the consonant structure is comparable in extent to that of the First Sound Shift. Thus it would be an important gain for the fortis-lenis hypothesis to demonstrate that this opposition did continue into Old High German, and furthermore that it played a decisive role in the High German consonant shift.

As is well known, Old High German is not a uniform language. Rather it was handed down in a number of documents which reflect the dialects of several geographical regions

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[1] Cf. Moulton (1954: 9 and 42).
[2] Summarized in Chapter I. pp. 30-32.

as well as monastic linguistic traditions. It is therefore expedient to examine the consonant systems of a number of documents which are thought to be representative of the major dialects and periods. We shall base our conclusion for Old High German on the evidence gained from these documents. It is our intention to focus particularly on those sounds which underwent a change in the High German sound shift. We shall attempt to reveal basic trends underlying the changes as they affect the system as a whole.

Our choice of documents was determined primarily to give a good representation of the major Old High German dialects, but the size of the documents and their period of writing was also considered. We therefore decided on the Isidor translation from about 780 A.D. representing a western type of Franconian, the East Franconian Tatian translation from the mid-ninth century, the South Rhenish Franconian *Evangelienbuch* by Otfrid of Weissenburg written between 863 and 871, and Notker's Writings from the end of the tenth century until 1022 written in Alemannic, which serve as representative of the Upper German dialect group.

The consonant systems of all four documents are treated briefly in an article by Valentin (1962), and in more detail in a publication by Penzl (1971). Voyles' contribution (1976) with a generative/transformational approach does not add significantly to the fundamental facts concerning Old High German phonology. Isidor is dealt with separately by Penzl (1959), and is also the subject of a transformational

study by Voyles (1974). Voyles (1979) also deals with the phonology of Tatian in a separate essay, viewing known facts from a different angle, as he did in his previous contributions, without adding much to what has been said elsewhere. Notker's system of consonants and in particular his *Anlautgesetz* are the topic of contributions by Penzl (1955/56; 1968), Simmler (1976), and Moulton (1979).

There can be no doubt that our primary evidence must be drawn from the orthography of the Old High German manuscripts.[3] Since our objective is to show that the fortis-lenis opposition was primary, in Germanic as well as in Old High German (i.e. over voice, aspiration), we must search for features of the orthography that indicate symptoms of fortis or lenis pronunciation. These include double spelling, spelling indicating affricate sounds, intensified pronunciation reflected in aspiration and voicelessness for fortis sounds, single spelling and indication of voice for lenis sounds.

It is necessary at this point to discuss some special features of the Old High German consonant system, before dealing with the consonants of the individual documents in detail. By doing this we hope to reach a clearer understanding of some of the changes that took place in the course of the Second Sound Shift. It also will give some idea on how the fortis-lenis contrast fits into these changes. These special features are the lenis and fortis

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[3] Cf. Penzl (1959; 1969; 1971: 34-37).

geminates and consonant clusters.

B. Lenis and Fortis Geminates and the Underlying Cause of the High German Sound Shift

Since we have associated length with fortis pronunciation, and since both lenis and fortis geminate stops occur in the Old High German manuscripts, their provenance and role in the sound shift deserve special attention. We are talking about orthographic OHG *bb pb* and *pp, dd td* and *tt, gg cg* and *kk (cc cch ck)*. For practical purposes the labial order will serve as example in this discussion.

In documented forms from West Germanic languages unaffected by the High German sound shift we find simplex and geminate stops /b/ and /p/, /bb/ and /pp/. The fortis-lenis contrast was independent of simplex/geminate.

Germanic	lenis	fortis
simplex	b	p
geminate	bb	pp

When Pre-OHG /p/ and /pp/ had shifted to [ff] and [pf], /bb/ remained the only geminate stop in the system. It therefore became irrelevant to meaning whether it was voiced or voiceless, lenis or fortis. However, since length had become the foremost auditory signal for the fortis-lenis

distinction, the long lenis /bb/ became fortis because of its length. The spelling *pp* in Old High German documents (Tatian *crippea*) for WGmc. /bb/ indicates the loss of voice, and, by the same token, the shift from lenis to fortis. The West Germanic state is retained in Low German which did not undergo the High German sound shift.

Low German

	lenis	fortis
simpl.	b	p
gemin.	bb	pp

High German

lenis	fortis
b	pf ff (f)
pp	ppf pf

Low German

	lenis	fortis
simplex	OS burg	OS opan OS plegan
gemin.	OS sibbeon OS kribbia	OS skeppian

High German

	lenis	fortis
simpl.	(O) burg	(T) offan (O) plegan, (N) flégen (O) pluag, (T) phluog (N) flûog
gemin.	(O/T) sibba	(O) scepfen
	(I) sipbea	
	(T) crippea (O) krippha	

These examples from the labial order demonstrate, however, that a clear-cut shift of lenis geminate stops to fortis geminate stops had not been completed in Old High German. Tatian and Otfrid both retain *bb* in *sibba*. At the same time Tatian shows the later development to *pp* (*crippea*) and Otfrid even has *pph* (*krippha*), presumably an affricate developed from [pp] < [bb].[4] Notker's writings from the second half of the tenth century to 1022 in Alemannic show the completed shift to fortis geminates: only *pp*, *tt*, *kk* (*cc*) occur: *úppîg*, *gesîppôt*, *sîppun*; *bétte*, *nôtte*, *féttachen*, *mîttêr*, *trîtten*; *lúkke*, *eruuékken*, *sékko*, *glóccunioche*. In the Alemannic 'Rule of St. Benedict' two centuries earlier we find mainly fortis geminates along with a few examples from the labial order occurring in fortis and lenis spelling: /tt/ *mitti*, *petti*, *dritto*, *kawatti*, *leitten*, *arabeittan*; /kk/ *lickan*, *wecken*, *ke-huckan*, *lucki*, *hrucki*, *blecken/blecchen*; but: /pp/ *lîppan/lîbban/lîban*, *erlaubpan/erlauban*.[5]

When therefore both *bb* and *pp* occur side by side in Old High German manuscripts, we must deduce that the geminates are partly still at the West Germanic stage; that is, we are dealing with an incomplete sound shift. Compromise spellings *pb* in Isidor *sipbea*, and *bp* in Würzburg Glosses *ubpic*, and

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[4] Lessiak (1933: 169) cites evidence of [pf] from modern Alemannic: *Chripf(e)*, *Chrüpf(e)*, (Schweiz. Id. 3,845), as well as MHG *kripfe* documented in the Alemannic region. Brinkmann (1965: 136) explains the unexpected representations of WGmc. **cribbja* in Otfrid and Tatian by direct borrowings from Upper German.

[5] The examples are from Simmler (1976: 31-34).

in the Benedictine Rule *erlaubpan*, support this view.[6] The fact that *pp* becomes the dominant form in later times shows that the development led to devoicing the lenis geminate stops, thus rendering them fortis. The shift of the lenis geminates fits the overall implementation of the High German sound shift, which appears complete in the Upper German area, particularly in Bavaria where the changes are assumed to have originated, and increasingly incomplete as one proceeds from East Franconian to South Rhenish Franconian, Rhenish Franconian and Middle Franconian.[7]

A gradation regarding the role of voice in the distinction between fortis and lenis, which can be observed in Old Saxon documents and in documents of Upper German provenance, is still present today in modern Upper German dialects. Brunner (1953: 319) observed that an increase in voice participation found in Lower Alemannic dialects may be linked to a decrease in duration when compared with Upper German dialects (Swiss), where a lack of voice seems to be compensated by greater duration.[8] The general statement of

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[6] According to Braune/Eggers (1975,§135,1) *bp* and *pb* spellings are common in Franconian documents: Frankf. *unsipbi*, Lorsch Confession *unsipberon*, Würzburg Glosses *ubpic*, Isidor *sipbea*. Only later on does *pp* become the dominant form in East and Rhenish Franconian.

[7] Cf. H. Brinkmann (1965: 136-149) who assumes that the High German consonantal changes in Franconian are the result of spreading from Upper German, in particular from Bavarian and Langobardian. This explains why the changes are more advanced in East Franconian which is closest to the Bavarian speaking area, whereas Rhenish Franconian, neighbour to Alemannic, appears to be more conservative.

[8] Brunner refers here to findings made by Ketterer (1942: 56,62,64,65,81,82).

an inverse relationship between voice participation and duration of consonants is corroborated by Gassert (1929) and Hentrich (1925).' What appears as a rule within the Alemannic dialect group is presumably also true for the entire German-speaking area. In the north of the German-speaking area voicing is present in the lenes, absent in the fortes, whereas in the south consonants tend to be pronounced more or less uniformly voiceless or weakly voiced, but a clear distinction in duration compensates for the loss of voice distinction.

So far our discussion of geminates has dealt only with the stops. Now we must add some comments regarding the Germanic geminate spirants, which are part of the same development. /ff þþ hh ss/ are considered lenis in Germanic, but are found on the fortis side by late Old High German. We shall first comment on their lenis status in Germanic, and then examine their development from Germanic into Old High German.

Guided by the assumption that spirants in Germanic were lenis, we consider the Germanic geminate spirants to be sequences of lenis phonemes. The lack of orthographic evidence of voicing suggests voicelessness, which is consistent with the shift to fortis.

' Gassert (1929: 54) 'Stimmhaftigkeitszunahme von Verschlusslauten steht in direktem Verhältnis zur Abnahme der Verschlusslängen.'
Hentrich (1925: 23) "Sowohl die Anzahl der Stimmlippenschwingungen in der Sekunde als auch ihre Intensität nimmt bei währender Dauer fortschreitend ab."

The development of the geminate spirants from Germanic into Old High German is not uniform. Whereas /ff hh ss/ remain spirants, and /ff/ and /hh/ merge as fortis spirants with reflexes of Gmc. /p/ and /k/, the dental geminate spirant /þþ/ follows a different route. First it becomes voiced. Isidor's *fethdhahha* reflects the beginning of this process. After, or simultanuously with the voicing, the geminate spirant becomes a stop [dd]. From here it develops like former Germanic geminate stop /dd/, which due to its greater duration had become voiceless /tt/ and consequently fortis in Old High German. By late Old High German the reflexes of lenis Gmc. /þþ/ and Gmc. /dd/ had merged in fortis /tt/. To illustrate this development we list a few examples from Old High German documents:[10] *fethdhahha* (Isidor, end eighth cent.), *feddhacho* (Interlinear Version of the Latin Hymns, eighth cent.), *feddah* (OHG Bibl. Glosses, Augsb. codex, tenth cent.), *fedacha* (rd. Glosses, 8-9th cent.), *fetdacha* (Glosses in cod. 218, eleventh cent.), *féttâh* (Notker, eleventh cent.).

We may therefore conclude that lenis geminate spirants underwent the same change as the lenis geminate stops in that they shifted to the fortis side as part of the High German sound shift.

The facts discussed above would support a claim, that the development which ultimately led to the High German consonant shift, consisted in lengthening the fortis

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[10] Quoted from E.G. Graf (1963: 449).

consonants. We see this as the underlying conditioning factor of the High German sound shift. The first phase of this process ended when the lengthened stop, simplex as well as geminate, became too long to remain in the stop category, and the additional duration was accomodated in a homorganic fricative, resulting in an affricate. Further developments, which happened in postvocalic position, led to the formation of a long fricative, followed by shortening after long vowel or diphthong in final position. The lengthening of the fortis consonants is also seen as responsible for the shift of the lenis geminates to the fortis side. Because voice is readily lost in long consonants, and because the fortis-lenis (voiced/voiceless) contrast was lightly loaded among geminates, the duration of the lenis geminates became decisive and gave rise to the change in status: the lenis geminates became fortis geminates. This change was consistent in Upper German. In Alemannic there is even some indication that the new fortis geminate underwent the shift to an affricate.''

The evidence from our Old High German and Old Saxon documents suggests the following gradation: in Low German, where the High German sound shift was without effect, the lenis geminate remained lenis. Franconian was only partly affected: the scribal usage of both *bb* and *pp* for Gmc. /bb/ in Tatian indicates that a change was taking place. The total domination of *pp* for Gmc. /bb/ in Upper German

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'' See footnote 4, Lessiak (1933), Brinkmann (1965).

suggests a complete shift from lenis to fortis. The evidence from the entire German area shows four parallel gradations based on the dialect differences on a north-south progression. They are (a) increasing difference in duration between voiced/lenis and voiceless/fortis consonants; (b) increasing absolute duration of voiceless/fortis consonants; (c) increasing tendency for the geminate voiced/lenis stop to be converted to fortis geminate; (d) increasing tendency for fortis stops to become affricates or fricatives. Traditionally it is only the last change that we think of as the Second Sound Shift. In fact it is only the most obvious part of a more complex phenomenon. (a) and (b) are root causes, (c) and (d) are responses.

The development of geminates in Old High German is therefore strong evidence of fortis-lenis contrast in Germanic.

C. Consonant Clusters

Well known exceptions to the High German sound shift are the consonant clusters /sp st sk tr ft ht/, in which the stop element does not undergo the change which it does in a CV syllable. These clusters retain their stops from Indo-European, whereas the reflexes of these stops elsewhere are lenis spirants:

IE /p t k/ > Gmc. /f þ x/ > OHG /v d h/

IE /sp st sk/ > Gmc. /sp st sk/ > OHG /sp st sk/

IE /dr pt kt/ > Gmc. /tr ft xt/ > OHG /tr ft ht/.

In keeping with the hypothesis that the High German sound shift was induced by a lengthening of fortis consonants,[12] the absence of shift in these clusters can be explained by an insufficient duration of the stop element due to its particular phonetic environment. According to Klatt,[13] consonants in Modern English tend to be shortened in most cluster environments. This shortening of segments amounts to 30% or more in some consonantal clusters. Klatt found that these changes to segment durations are large enough to be perceptible. Applied to the Germanic consonant cluster this means that the stop element, although being voiceless like a fortis, was more like a lenis in terms of duration, e.g. /s/ + Gmc. /p t k/ did not change because the length of the stop was shorter than required for Gmc. /p t k/ > OHG /ff zz hh/ and OHG /pf tz kx/. Similarly /s/ + IE /p t k/ did not change. It is commonly held that IE /p t k/ shifted to Pre-Gmc. [p' t' k'] before giving Gmc. /f þ x/. This stage of aspiration reflects increased duration of the original Indo-European stop. For the development of /s/ + IE /p t k/ we assume lack of aspiration in Pre-Gmc. [sp st sk] and therefore shorter duration than was required for IE /p t k/ > Gmc. /f þ x/.

Moulton (1954: 35) has a different opinion on the Old High German clusters. In a footnote he states:

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[12] See part B. of this chapter 'Lenis and Fortis Geminates and the Underlying Cause of the High German Sound Shift'.
[13] Klatt (1976: 1214).

> Through the familiar exceptions to the HG sound shift, inherited /sp st sk tr ft xt/ gave OHG /sp st sk tr ft xt/, which I interpret as fortis stops and spirants.

Presumably Moulton is guided by the usual interpretation that voiceless indicates fortis. We disagree with this on acoustic phonetic grounds, in that these stops are too short to be considered fortis, and that they behave more like lenis sounds by not shifting.

A lack of voice contrast between the consonant clusters adds to the uncertainty with regard to the status of stops in clusters. There is no contrast /st/ : */sd/, /sp/ : */sb/, /sk/ : */sg/, /ft/ : */fd/, /ht/ : */hd/.'[4] In these environments the stop is not part of the fortis-lenis contrast, in other words, fortis-lenis is suspended for the stops in these clusters. However, because of phonetic similarity we have decided to assign these stops to /t/, /p/ and /k/.

D. Orthographic Evidence for a Fortis-Lenis Opposition in the Old High German Isidor Translation

The oldest Old High German document to be considered here is the Isidor translation. The original Old High German translation of the treatise *De Fide Catholica Contra Judaeos* by Bishop Isidor of Seville is dated at about A.D. 780. The two existing copies of the original are thought to have been

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'[4] /tr/ is an exception, because the contrast /tr/ : /dr/ exists in Isidor *triuuua : druhtin.*

made about A.D. 800. The manuscript in Paris contains the Latin parallel text beside the Old High German translation, whereas the socalled Monsee-Vienna Fragments contain only the Old High German text. The precise date and place of origin, however, are not known. The dialect of the translation is unlike that of any other document. Based on certain orthographic features some scholars believe it to be of West Franconian origin, but the argument is hampered because of lack of documents which are known for certain to be West Franconian.'[15] The Isidor orthography reflects a well-devised system with a clear distinction between phonemes.

Analysis of consonantal orthography
leading to a fortis-lenis phonemic system.'[16]

Labials

Labial Stops

For the stops we find the following spellings: *b p ph pb*.

/p/ Apart from the loan words there is no initial or intervocalic *p* in the text: *predigon, paradises, apostolus*. In native words *p* occurs after liquids:

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[15] See Bostock (1976: 123-124); Bruckner (1935); Kirschstein (1962); Matzel (1970).

[16] The examples are taken from *Der althochdeutsche Isidor. Nach der Pariser Handschrift und den Monseer Fragmenten neu herausgegeben*. 1964. Hans Eggers (ed.). Only few examples are cited in each case. Occasionally, however, a conclusion will have to be based on a single occurrence.

hilpit, aruuorpan, in final position: *scaap*, and as the result of final devoicing: *selp, halp, chiscrip. ph* seems to be a spelling variant of *p* finally: *bileiph, screiph, uphstigan.*''

/b/ It occurs as *b* in initial and medial position: *bifora, boohhun, selbo, simbles, gibu.*

/pb/ It occurs as *pb* in intervocalic position only: *sipbea.*

/p/ and /b/ contrast initially and medially, if loan words are taken into account. In final position the contrast is suspended. /b/ and /pb/ are in contrast between vowels. /p/ we consider fortis guided by voicelessness indicated in the symbol *p*. It contrasts with /b/, which is to be taken as lenis because of single spelling and the symbol *b* indicating voice. /pb/ in *sipbea* reflects the West Germanic lenis geminate stop in **sibbjō*. This lenis geminate became partly devoiced as the result of being long. The next stage in this development is a completely devoiced geminate [pp] which is to be considered fortis by virtue of length and voicelessness. (In Old High German generally only fortis consonants were long, and these were also voiceless). Although the Isidor spelling does not show the final stage of this development, the spelling *pb* indicates that devoicing is well under way. Thus assigning /pb/ to the

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[17] This interpretation is supported by Penzl (1959: 360): "'ph' ist in heimischen Wörtern im System Isidors eine graphische Variante von 'p', z.B. *screiph*".

fortis side would be defensible.'[8] We choose, however, to see /pb/ as a transitional geminate clearly on its way to become a fortis. (The same holds true for the velar /kg/ < WGmc. /gg/ in *daucgal*. Only in the case of the dental lenis geminate stop does the development appear to be completed: we therefore consider Isidor /tt/ < WGmc. /dd/ a fortis geminate.'[9])

Labial Spirants and Affricate

For the spirants we find the following spellings: *u f ff*. In initial and final position only *f* occurs: *fingrum*, *chiscuof*. Intervocalically all three occur: *auur*, *hreofun*, *griffa*. Based on comparative historical evidence we set up two phonemes: /v/ < Gmc. /f/, and /f/ < Gmc. /p/.

/v/ occurs as *f* initially, and as *u* intervocalically: *fingrum*, *auur*.

/f/ occurs intervocalically as *ff* following short vowels: *griffa*, as *f* following long vowel or diphthong: *hreofun*, *daufin*, preceding consonant: *after*, and in final position: *chiscuof*, *uuolf*.

/v/ and /f/ are in contrast intervocalically. /f/ we regard as fortis in relation to /v/ by virtue of the digraphic spelling after short vowel and the voicelessness indicated by the symbol *f*. /v/ is considered lenis as indicated by the single spelling and its intervocalic grapheme *u* indicating

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'[8] This is the view held by Valentin (1962: 344).
'[9] See below under 'Dentals' and 'Velars'.

voicing in voiced surroundings.

/pf/ The labial affricate occurs intervocalically only and contrasts in this position with /b/ and /pb/: *hepfen*, *ubarhepfendi*.[20]

We consider /pf/ fortis because of its digraphic spelling and the duration which is implied by an affricate, and also because of its voicelessness indicated by the symbols *p* and *f*.

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[20] Penzl (1959: 360) suggests that in view of all other examples with unshifted WGmc. /p/ these two examples might possibly be foreign to the dialect of the text. The *pf* spellings are surprising, since they reflect WGmc. /ff/ in these two examples.

Table of labial phonemes

Feature	Phoneme	Spelling		
		initial	medial	final[21]
fortis	/p/	(p-)[22]	(-p-) -Cp-	-p (-ph)
	/pf/		-pf-	
	/f/		-V̄ff/V̄f/fC-	-f
transitional	/pb/		-pb-	
lenis	/b/	b-	-b-	
	/v/	f-	-u-	

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[21] Devoicing of lenes and shortening of fortes in final position results in the neutralization of the fortis-lenis opposition. The question of how to treat final position with regard to phonemic status will be resolved as follows: since final lenis stops and fricatives develop to Modern German voiceless stops and fricatives that correspond to fortis phonemes in other positions, we consider these finals as allophones of fortis phonemes and regard lenes as absent from final position. We prefer this to adopting archiphonemes for reasons of convenience in transcription. Since this does not apply to all Old High German dialects to the same extent, we shall refer to this footnote whenever applicable.

[22] Symbols in parentheses imply marginal occurrence or occurrence in non-indigenous words.

Dentals

a. Discussion on Dental Change.

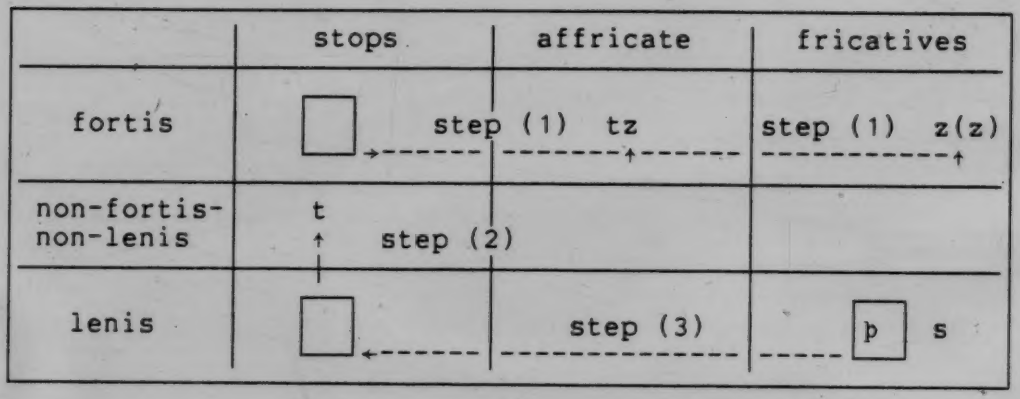
The change of the dental group from West Germanic into Old High German consists of three steps:

(1) The High German sound shift, in which fortis Gmc. /t/ shifts early to affricate or fricative, thereby leaving a *case vide*. The affricate and fricative remain in the fortis category.

(2) Lenis WGmc. /d/ becomes voiceless and moves towards the *case vide* left by shifted Gmc. /t/. When WGmc. /d/ becomes voiceless, it does not increase its length. It is therefore the only short voiceless consonant in the Old High German system. Step 2 involves a shift from lenis in the direction of fortis, leaving a *case vide* where WGmc. /d/ had been.

(3) Lenis Gmc. /þ/ becomes OHG /d/, thereby filling the *case vide* left by WGmc. /d/. This change takes place within the lenis category. The loss of /þ/ regularizes the subsystem of fricatives by reducing the number of fricatives to that of the stops.

Table illustrating dental change



In a phonemic system of Old High German the voiceless dental stop /t/ behaves like an outsider in that it fits neither the lenis nor the fortis group of phonemes. R. d'Alquen gives the following description of the status of OHG /t/:

> Any lengthened consonant is or becomes part of the fortis side of the opposition, since length is the auditorily governing feature. All the fortis sounds are voiceless. On the lenis side the sounds are short, and voicing depends on context if present at all. Phoneme /t/ does not belong fully to either side: it is short (like a lenis), contrasting with /tt/, but also voiceless (like a fortis) and in contrast with the reflex of lenis Gmc. /þ/, which is sometimes written *t*, sometimes *d*. OHG /t/, then, really belongs to a third, non-lenis-non-fortis group, of which it is the sole member.[23]

b. Analysis of the Dentals

Dental Stops

Disregarding for the moment the result of shifted Gmc. /t/, we expect two phonemes as the result of the three-step

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[23] d'Alquen (1979: 196).

development, i.e. the Old High German reflexes of WGmc. /d/ and /þ/. The matter is complicated by a few occurrences of Gmc. /tr-/, which as well-known exceptions did not shift. With this in mind we shall examine the spellings *t d dh*.

t occurs initially in loan words: *tempel*, *titulo*, and before *r*: *triuua*. It also occurs in clusters with *s*, *f* and *h*: *gafestinota*, *frumiscafti*, *almahtic*, and in final position: *got*, *gasentit*, *ziit*, *reht*. Between vowels *t* alternates frequently with *d* without implying phonemic contrast: *gotes - godes*, *chundita - sendida*.

d occurs initially and medially: *dohter*, *druhtin*, *duri*, *dor*, *deda*, and is in free variation with *t* in final position when preceded by *h*: *rehd ~ reht*.

dh occurs in all positions and alternates with *d*: *dhanne - danne*, *dhuo - duo*, *dhiz - diz*, *salbidhu - chiuualdidu*, *uuardh - wward*.

Based on the contrast between *d* and *t* found in *druhtin*,[24] *dribit*, vs. *triuuua*, *chitriuuui*, we are setting up two stop phonemes /t/ and /d/, and one spirantal phoneme /đ/.[25]

/t/ comprises unshifted Gmc. /t/ as in *triuuua* and *t* in loan words. For reasons of phonetic similarity, *t* in the clusters *st ft ht* is assigned to /t/. It should,

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[24] *druhtin* occurs once spelled with *t*: *truhtin*. When compared with the rather frequent and consistent spelling with *d*, the single occurrence of *t* spelling is best considered as a scribal error.

[25] Cf. Penzl (1971: 63; 70; 74), whose view agrees with our interpretation. Valentin (1962: 343), however, sets up only two phonemes, /d/ and /dh/. This is possible if one considers the occurrence of unshifted Gmc. /t/ in *triuuua* too marginal for a separate phoneme.

however, be borne in mind, that in these environments fortis vs. lenis is suspended for lack of contrast.[36]

/đ/ reflects WGmc. /đ/. Its voiceless allophones *t* medially and finally indicate that /đ/ is shifting toward /t/. In initial position /đ/ appears still fully voiced and in contrast with voiceless /t/.

/đ/ has two allophones in free variation, [đ] and [d], which are the intermediate and final stage in the change WGmc. /þ/ > OHG /đ/.

We consider /đ/ to be lenis because of single spelling and the implication of voice expressed in both *dh* and *d*. The symbol *h* in *dh* does not indicate aspiration but reflects the spirantal quality of the sound. /t/ is regarded to be neither fortis nor lenis, because of its voicelessness excluding lenis, and its short duration, which rules out fortis.[37] /d/ is assumed to be lenis because of single spelling and voicing indicated by the symbol *d*.

Dental Geminates

/tt/ The dental stop occurs geminated in intervocalic position: *dhritto, bitdande, mittingardes, anthlutte.*

/þđ/ The spirantal geminate occurs only once: *fethdhahha.*

/tt/ is assumed to be fortis due to its double spelling and voicelessness implied by the symbol *t*. The spelling *td* in *bitdande* is the only indication of a transition from West

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[36] See part C. of this chapter.
[37] See discussion on dental change of this section.

Germanic lenis /dd/ to High German fortis /tt/ through loss of voice. Since the transitional spelling *td* occurs only once as compared to the regular spelling *tt*, we consider the change of the dental geminate stop as completed.[28] The transition of lenis geminate to fortis geminate is also found in /þđ/ < lenis WGmc. /þþ/.[29] The spelling *thdh* in Isidor indicates the first step of this development by voicing the second component of the geminate. At this point we still have two lenes together in /þđ/; however, a lenis geminate is not compatible with the concept of fortis-lenis contrast in Old High German, where increased length indicates fortis sounds. It has been pointed out, that the direction of the change is toward fortis geminates, whereby the reflex of WGmc. /þþ/ coalesces with /tt/ < WGmc. /dd/, as is already the case in Upper German.[30] Since we are allowing for transitional phoneme sequences, /pb/, and /kg/ below, and since the direction of the change is clearly toward a fortis, we consider /þđ/ a phoneme sequence in transition.

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[28] See part B. of this chapter.

[29] Moulton (1969: 253) assumes Early-OHG /þ/ to be a lenis spirant and /þþ/ a fortis spirant, which change to a lenis stop /d/ and a fortis stop /tt/ respectively. Cf. also Valentin (1962: 344), who lists /thdh/ (his symbol) among the fortis phonemes. Penzl (1971: 70), however, expresses slight uncertainty in assigning /þþ/ to the fortis side: '*thdh*...könnte ein Fortisallophon in der Gemination /þþ/ bezeichnen.'

[30] Notker's Alemannic: *féttachen, spóttôn* < WGmc. /þþ/
mîttêr, bétte < WGmc. /dd/.

Dental Spirants and Affricate

We find the following spellings: *s ss zs zss z tz.*

/s/ *s* occurs in all positions: *simbles, galesan, huus.*

/ss/ *ss* occurs only between vowels: *gauuisso, dhrinissa.*

The following two phonemes reflect Gmc. /t/:

/z/ The fricative occurs as *zss* and *zs* which are in complementary distribution. *zss* occurs between vowels regardless of length: *ezssant, fuozssi; zs* occurs in final position: *dhazs, izs.*

/tz/ The affricate occurs as *z* in initial and final position and after consonants, and as *tz* between vowels: *ziit, diz, uurza, sitzendan.*

The choice of symbols for the dental fricative *zs(s)* and affricate *(t)z* in the OHG Isidor is unique in that it avoids ambiguity in the spelling of *z(z)* for both sounds. We consider /ss/ fortis due to its digraphic spelling and the symbol *s* implying voicelessness. It is in contrast with intervocalic /s/, which appears to be short because of its single spelling. Historically Proto-Gmc. /s/ became voiced under conditions of Verner's Law, and in Modern German /s/ is voiced in voiced surroundings. Guided by these criteria, we assign /s/ to the lenis side. /z/ and /tz/ we regard as fortis because length is indicated in the digraphs *zs, zss* and *tz*. The affricate signals voicelessness in the spelling *t* plus fricative, whereas in the fricative the component

s(s) indicates voicelessness.[31]

Table of dental phonemes

Feature	Phoneme	Spelling		
		initial	medial	final
fortis	/tt/		-tt/td-	
	/tz/	z-	-tz-/-Cz-	-z
	/z/		-zss-	-zs
	/ss/		-ss-	
non-fortis-non-lenis	/t/	(t-)(tr-)	-(t)- -st/ft/ht-	
transitional	/þð/		-thdh-	
lenis	/d/	d-	-d/t-	-d/t
	/ð/	dh/d-	-dh/d-	-dh/d
	/s/	s-	-s-	-s

Velars

Velar Stops

For this group we find the following spellings: *ch c cch g gh cg cc.*

/k/ The voiceless velar stop occurs as *ch* in initial position and after consonants: *chideda, chundenne, chneht, folcho, marchunt.* In final position it occurs as *c*: *infenc, einic, burc, hellac, uuac, folc, chidanc.* The

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[31] Further evidence for /z/ being fortis comes from the fact that in later development /z/ merges with fortis /ss/ in intervocalic position.

morpheme Gmc. /ga-/ occurs regularly as *chi-: chiboran, chilaubit.*

/kk/ The voiceless velar stop occurs geminated as *cch* between vowels: *lucche, acchar.*[32]

/g/ The voiced velar stop occurs as *g* preceding back vowels, and as *gh* preceding front vowels, both in initial and medial position: *gotes, gheistes, bergan, folghen, magad, heilegan, saghet.* As the result of final devoicing /g/ does not occur in final position.

/kg/ The WGmc. voiced geminate stop /gg/ occurs as *cg* and *cc*: *daucgal, hrucca.*

The unusual digraphs *ch, cch* and *gh* for velar stops[33] are explained by the orthographic tradition found in the West Franconian region. Merovingian scribal practice required an *h* after velar stops in order to prevent palatalization in front of palatal vowels.[34] The spelling practice of the Old High German Isidor seems to be based on this Romance orthographic tradition. Although this theory is widely accepted, and is adopted here, some scholars prefer to

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[32] The example *acchar* is taken from G.A. Hench (1890: 118).
[33] *quh* should also be listed here. It is not treated separately in the phonemic analysis, because it is considered as a sequence of the voiceless velar stop and the labial semivowel.
[34] See Kirschstein (1962: 120): "Die von romanischer Aussprache verschiedene deutsche Lautung bedurfte in grösstenteils romanisch schreibender und sprechender Umgebung durchgängig der diakritischen orthographischen Kennzeichnung."
Concerning the same topic see also Bruckner (1935: 71 f.), Penzl (1959: 357-358), and Matzel (1970: 390).

interpret *ch* as an aspirated [k],[35] or *ch* and *cch* as affricates.[36] We assume /g/ to be lenis due to single spelling and the symbol *g* implying voice in voiced surroundings. /k/ is considered fortis based on voicelessness as indicated by the symbol *c*. /kk/ is considered fortis because of length expressed in the gemination, and because of voicelessness as indicated by the symbol *c*. /kg/ reflects WGmc. lenis geminate stop /gg/. As we have seen in the labial and dental order, devoicing, which was brought about by the greater duration of the geminates, leads to a shift from lenis to fortis. The digraph *cg* indicates that the first element is voiceless (fortis) and the second element is voiced (lenis). We regard it therefore as a transitional geminate which is about to become fortis and to merge with /kk/, as is already apparent in *hrucca*, where both elements are voiceless.[37]

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[35] Cf. Braune/ Mitzka (1967,§143,3). In the new edition Braune/ Eggers (1975,§143,3), however, the editors do not explicitly support the view of aspirated [k].

[36] Hench (1890: 117-118). Voyles (1974: 73) assumes an affricate in initial position (< Gmc. /k/) based on the fact that *ch* occurs quite frequently before back vowels, e.g. *chalp, chumfti, chuning*, where there was no need to prevent palatalization by *ch* spelling. Counterevidence comes from the spelling of the reflex of Gmc. /k/ in final position where we find only *-c* indicating a stop. It does not correspond to the known stages of development of the High German sound shift to assume an affricate in initial position and a stop in final position, both reflecting Gmc. /k/. Kirschstein (1962: 68) attributes the extended use of *ch* in positions before back vowels to a generalization of Romance scribal practice.

[37] Valentin (1962: 344) sees in the opposition /k/ : /kg/ aspiration as the distinctive feature. Since he uses the phonemic symbols /ch/ : /cg/, his view may be influenced by orthographic *ch*.

Velar Spirants

The spirants are reflected in the orthography as *h* and *hh*. *h* occurs in initial, intervocalic and final position, and preceding consonants: *huuer, heilegim, spahida, dih, ih, auh, noh, miluh, truhtine*. *hh* occurs intervocalically only: *sohhet, boohhum, rihhe, sahha*. Taking historical origin into consideration, Gmc. /x/ and Gmc. /k/, we are setting up two phonemes: /h/ *h- -h-*, /x/ *-hh- -hC- -h*. /h/ and /x/ are in contrast only between vowels.

/h/ is considered lenis based on its single spelling. Further evidence in support of lenis status comes from the tendency of intervocalic /h/ to become voiced and to disappear, e.g. *spaida* vs. *spahida*.[38] We assume /x/ to be fortis due to the digraph *hh* and its voicelessness indicated by the symbol *h*.

Table of velar phonemes

Feature	Phoneme	Spelling		
		initial	medial	final[39]
fortis	/k/	ch-	-Cch-	-c
	/kk/		-cch-	
	/x/		-hh-/-hC-	-h
transitional	/kg/		-cg-/-cc-	
lenis	/g/	g-/gh-	-g-/-gh-	
	/h/	h-	-h-	

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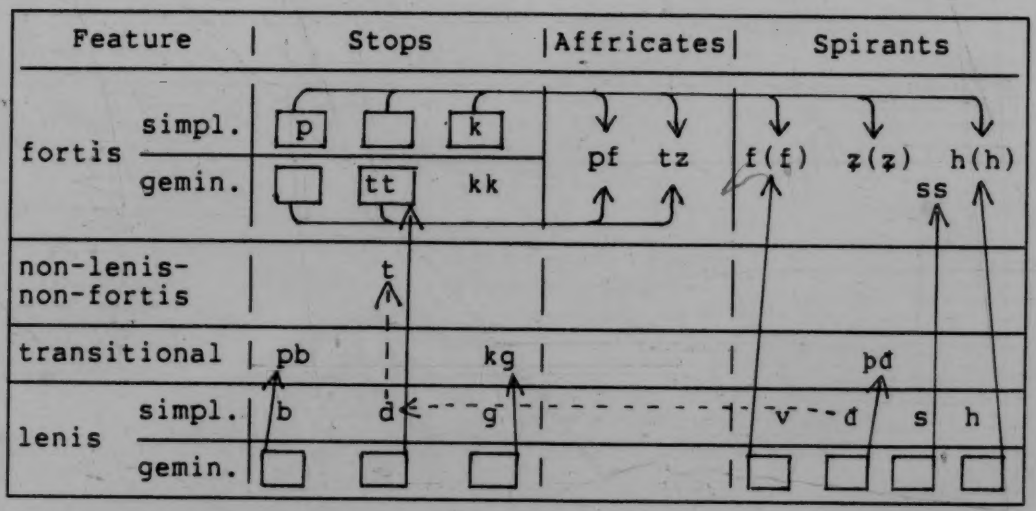
[38] See Penzl (1971: 70).
[39] See footnote 21 for neutralization in final position.

Conclusion

Table of Isidor consonants



Note: The squares indicate positions that were filled in Germanic. The lines connect with the corresponding Isidor consonants. Broken lines indicate changes in progress.

The table above demonstrates that the change affecting the consonant system is connected with fortis: the tenuis shift takes place within the fortis category, and the lenis geminates shift from lenis to fortis.

It also shows that Germanic did not have fortis spirants. These were supplied in Old High German by the fricatives resulting from the tenuis shift and the lenis geminate spirants. Of the latter, /þđ/ has been slow to

develop, since /ʒ/ fills the position for 'dental' fortis, and /ss/ is also phonetically close. Hence /þð/ will eventually deviate to the stops and coalesce with /tt/ < Gmc. /dd/.

The lenis geminate stops have begun to move into the vacated fortis geminate stop series. Old /dd/ has completed this process, whereas /pb/ and /kg/ have only gone part of the way. Isidor's spelling practice makes it clear that /kg/ has not yet coalesced with old /kk/, which incidently has not left its position: old /kk/ is rendered as *cch*, whereas /kg/ occurs as *cg* and *cc*.

The fortis stops that have shifted have moved into the new fortis categories of affricates and spirants. We assume that WGmc. /ff/ behaves exactly like the reflex of Gmc. /p/ in that it occurs in geminate spelling following a short vowel, and in single spelling following a long vowel or diphthong. However, the evidence is inconclusive since the two examples in the Isidor text, which contain WGmc. /ff/ occur with the affricate *pf* instead. Apart from that, *pf* does not occur, which supports the view that *pf* is foreign to the dialect of the text. /ss/ is not subject to the same alternation conditioned by the preceding vowel: it always occurs geminated.

The fact that voice seems to be an unstable feature among the lenes indicates that the voiced/voiceless contrast is not of primary importance to the system as a whole. Instead it becomes evident that duration plays the decisive

role in the big changes affecting the system. The duration of Gmc. /p t k/ became too long for stops, which therefore turned into affricates and spirants. WGmc. /pp tt kk/ were even longer and are therefore assumed to have begun the process. The greater duration of WGmc. /bb dd gg ff þþ ss hh/ compared with Gmc. /b d g f þ s h/ led to their reinterpretation as fortes. As the old lenes are turned into fortes, voicing, which was subsidiary, ceased to be present altogether.

The evidence gained from the Old High German Isidor is in support of the hypothesis, in that the fortis-lenis opposition is the primary distinctive feature, and that voice contrast assumes basically a subsidiary function.

E. Orthographic Evidence for a Fortis-Lenis Opposition in the Old High German Tatian Translation

The Old High German Tatian is preserved complete, together with a Latin version, in one manuscript, the *Codex Sangallensis 65*, which dates from the mid-ninth century. It is a translation of a Latin version of the *Diatesseron* from the second century made by a Syrian named Tatian. The German translation is in the East Franconian dialect, which is associated with Fulda. Six scribes worked at compiling the manuscript, which accounts to some extent for the spelling variations. We shall examine the text of the Tatian

following the same methods as with the Old High German Isidor. The spelling and spelling variants of consonant phonemes are to be taken as indicators for fortis and lenis.

Analysis of consonantal orthography
leading to a fortis-lenis phonemic system.**

Labials

Labial Stops

For the stops we find the following spellings: *b p bb pp.*

/p/ In initial position *p* occurs only in loan words: *Pilato, predigôn.* It also occurs after *s*: *gotspel*, and in final position as the result of final devoicing: *lamp, giscrip.* Very rarely *p* occurs initially as a spelling variant of /b/ in *perahtnissi, prah.*

/b/ *b* occurs in all positions: *bidiu, bitit, brotes, habet, houbit, salbo, uuib, lib, gab.* In final position we find also *p* which indicates devoicing: *gescrip, gap*, and hence absence of /b/ finally.

/pb/ The labial stop occurs in gemination as *bb* and *pp* between vowels: *sibba, gotauuebbi, crippea, crippa.*

/p/ is a phoneme with a small functional load: initially in

** The examples are taken from *Tatian. Lateinisch und altdeutsch mit ausführlichem Glossar.* 1892. E. Sievers (ed.), 2nd ed., new print 1960.

loan words and in the cluster *sp-*[41] reflecting unshifted Gmc. /p/. We consider it fortis based on voicelessness indicated in the symbol *p*, and on its contrast with /b/, which we regard as lenis because of single spelling indicating short sound, and the implication of voice in the symbol *b*. /pb/ reflects WGmc. lenis geminate stop /bb/. As discussed above,[42] the change of the old lenis geminates is toward fortis in the Old High German period. Since, however, /pb/ occurs in the Tatian text in both lenis and fortis spelling, we consider it to be a sequence of phonemes in transition.[43]

Labial Spirants and Affricate

For the spirants we find the following spellings: *u f ff*. In initial position *u* and *f* occur, in final position only *f* occurs, and *ff* is found only intervocalically. We set up two phonemes: /v/ < Gmc. /f/, and /f/ < Gmc. /p/.

/v/ occurs as *u* and *f* initially in free variation, however, *f* occurs more frequently initially, and *u* more frequently medially: *follu, ferit, uaz, uallent, grauon, reue, zueliui, grafo, diufale.*

/f/ occurs intervocalically as *ff* following short vowels:

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[41] Cf. part C. of this chapter.
[42] Cf. part B. of this chapter.
[43] Valentin (1962: 345) lists /bb/ as fortis. We feel, that in view of the changes during the Old High German period regarding Germanic lenis geminates, transitional status gives greater emphasis to the shift from lenis to fortis. It also does better justice to the spelling variants of the geminate phonemes.

bigriffun, *offanota*, *skeffe*, and as *f* mainly when following long vowel or diphthong: *tiufi*, *toufenti*, *scuofen*, but also *ofano*; when followed by consonant: *ofto*, and in final position: *scef*, *fimf*, *arriof*. In intervocalic position following diphthongs there is spelling overlap of /v/ and /f/: *diufale* - /v/ and *tiufi* - /f/.

We regard /f/ as fortis by virtue of its double spelling after short vowels and voicelessness implied by the symbol *f*. /v/ is considered lenis because of its single spelling and the indication of voice expressed by the symbol *u*. In final position the fortis-lenis contrast is suspended.[44]

/pf/ For the labial affricate we find the following spellings: *ph pf bph*. *ph* occurs in all positions: *phorta*, *skephet*, *uzuurphun*, *hulphin*, *uuirph*. *pf* occurs a few times initially and between vowels: *pfenningo*, *clopfo*, *tropfo*. It appears that scribe 'zeta' used preferably *pf* following *r*, *l*, *m*, whereas scribe γ prefered *f*, and scribe β prefered *ph* in the same environment.[45] *bph* occurs only once in *obphar*.

/pf/ is considered fortis due to voicelessness and greater length which is implied by an affricate sound.

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[44] See footnote 21.
[45] Cf. Sievers (1892: XXXVII).

Table of labial phonemes

Feature	Phoneme	Spelling		
		initial	medial	final[‘‘]
fortis	/p/	(p-) sp-		-b/-p
	/pf/	ph- (pf-)	-ph/pf/bph-	-ph
	/f/		-v̄ff/v̄f/Cf-	-f
transitional	/pb/		-bb/pp-	
lenis	/b/	b-(p-)	-b-	
	/v/	f-(-u)	-u-(-f-)	

Dentals

Dental Stops

The three-step development of the dental order as discussed on pp. 71-72 is also the basis for the analysis of the dentals in Tatian. The following table illustrates the development of Gmc. /đ/ and /þ/, which are reflected in Tatian by orthographic *t d th đ*.

	þ	>	đ	>	d	>	t
Gmc. /đ/			*đagaz	>	dag	>	tag
Gmc. /þ/	þem	>	đem	>	dem		
period	1		2		3		

t occurs in all positions and varies initially with *d* in a few cases: *tag - dag, tode - dode, teta, fatero, untar,*

‘‘ For neutralization in final position see footnote 21.

got, uuort, sterban, stein.

d occurs in medial and final position: *fundi, quedenti, quidis, uuirdit, quad, manod, uuard.*

th occurs in initial position: *thio, thar, thû, thâhta, thiornum.* A few times it occurs as *đ* and *d*: *đemo, đem, dih, dar.*

Based on the above diagram we set up two phonemes: /t/ < Gmc. /đ/, /d/ < Gmc. /þ/.

/t/ *t-/d-, -t-, -t* and /d/ *th-/đ-/d-, -d-, -d* both represent the final stage of the shift. In initial position we find orthographic traces of earlier stages.''

We consider /d/ to be lenis because of the implication of voice expressed in the *d* and *đ* spelling, and the single spelling which indicates a short sound. /t/ is regarded to be neither fortis nor lenis because it is short like a lenis but voiceless like a fortis.'' The spelling variant *d* initially does not warrant the assumption ofvoice participation in other positions. As in Isidor, /t/ is

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'' Our analysis is in principle supported by Valentin (1962: 345-346). He seems uncertain though, whether to consider /d/ a spirantal or a stop phoneme. Hence his symbol: /th,d/. Penzl (1971: 86-87; 91-92) on the other hand, sets up three phonemes: /t/ t-/d-, -t-, -t, /d/ -d-,-d, and /þ/ th-. We disagree with this interpretation on two grounds: (1) although orthographic *th* initially is the predominant manifestation,,we cannot ignore considerable number of spelling variations with *d*, e.g.: *truenti - druoet, druoanti; thu - du; thurri - durrero; mit thiu - mit diu,* among others. (2) /þ/ and /d/ (Penzl's phonemes) correspond historically to one phoneme, Gmc. /þ/. /þ/ and /d/ are therefore better interpreted as one phoneme /d/ with a spirantal allophone in initial position reflecting an earlier stage.

'' See part D. 'Dentals'.

assigned a special place in the system.

/tt/ The dental stop occurs geminated as *tt* in intervocalic position: *mitten, betti, luttar, bittan, thritto.*'' Except for *luttar*, /tt/ reflects WGmc. /dd/.

/tt/ is assumed fortis due to voicelessness and greater duration as is reflected in the digraph.

The West Germanic geminate spirant /þþ/ does not occur as a geminate in the Old High German Tatian text. We find only single spelling in *federacha* vs. Isidor *fethdhahha.*

Dental Spirants and Affricate

For spirants and affricate we find the following spellings: *s ss z zz.*

/s/ *s* occurs in all positions: *salbôn, uuese, hûs.*

/ss/ *ss* occurs only between vowels: *finstarnessi, berahtnessi, heilagnesse.*

The orthography of the Tatian, unlike the Old High German Isidor, does not differentiate clearly between dental spirant and affricate, which reflect WGmc. /t/ and /tt/. Comparative evidence, however, suggests the following distribution.

/z/ The spirant occurs usually as *z* when preceded by a long vowel or a diphthong, and as *zz* when preceded by a short vowel: *lâzan, heizan, sliozan,* but *fuozzi; hazzetun, scuzzila, uuizzan, ezzent,* but *ezente.* In final position

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'' The latter two examples occur also with a simplified dental stop: *bitit, bitu, bitenten; thritun, driten.*

it always occurs as *z*: *thaz, hiez, uuazzarfaz.*

/tz/ The affricate occurs as *z* initially, medially after consonant, and in final position: *zit, zeichano, zilotun, herzun, unzan, phorzicha, scaz.*

Intervocalically it occurs as *zz*: *sezzit, sizzentan.*

Occasionally the affricate is spelled *c*: *cit, lucil.*

We assume /ss/ to be fortis based on its digraphic spelling which indicates greater duration, and the absence of voice in the symbol *s*. Additional support for /ss/ being fortis comes from the fact that /ss/ merges with intervocalic /z/ in the Middle High German period. /s/ is considered to be lenis based on its single spelling which implies a short sound. Although the symbol *s* is not connected with voiced pronunciation, we know that historically Proto-Gmc. /s/ became voiced under conditions of Verner's Law. Also in Modern German /s/ is voiced in voiced surroundings. /z/ and /tz/ are considered fortis because greater duration is indicated in the digraph *zz*. Also the phonetic realization of an affricate implies greater length than for the stop or fricative singly. Voicelessness is not apparent in the orthography. In Modern German, however, reflexes of OHG /z/ and /tz/ are voiceless.

Table of dental phonemes

Feature	Phoneme	Spelling		
		initial	medial	final
fortis	/tt/		-tt-	
	/tz/	z-	-Cz/zz-	-z
	/z/		-V̄z/V̄zz-	-z
	/ss/		-ss-	
non-fortis-non-lenis	/t/	t-/đ-	-t-	-t
lenis	/d/	th/đ/d-	-d-	-d
	/s/	s-	-s-	-s

Velars

Velar Stops

For the stops we find the following spellings: *k c g kk kc cc gg cg.*

/k/ The voiceless velar stop occurs as *k*, alternating with *c*, in initial position, medially after consonant, and in final position, where it is also the result of final devoicing: *kneht, kundon, cunni, caltes, folke, urcunde, folc, scalc, tranc, mac, berc, heilac, thinc, zuoglenc.*[••]

/g/ It occurs as *g* in initial and medial position: *gotes,*

[••] Final devoicing occurs also when *g* occurs in a sequence with a nasal sound *-ng*. This implies that *ng* is to be considered a sequence of two phonemes /n+g/ rather than one phoneme as in Modern German /ŋ/. The reverse spelling with *-g* in *trang* for *-c* in *tranc* 'beverage' also points to the biphonemic valuation of /ng/.

tage, spunga, folgetun, burgi. When *g* occurs in final position, it is due to analogy: *bergi : berges*.[51]

/kk/ The voiceless velar stop occurs geminated as *kk, cc, ck* and *kc* between vowels: *aruuekkan, thekki, accares, heuuiscrekco, nackot*.

/kg/ The West Germanic geminate stop /gg/ occurs as *gg* and *cg*: *luggi, giuuiggi, mucgun*.

We regard /g/ as lenis based on its single spelling indicating a short sound, and its implication of voice expressed by the symbol *g*. Initially and medially after consonant it is in opposition with /k/ which is assumed to be fortis. This is based on the absence of voice as indicated by the symbols *k* and *c*. Since, however, there is no indication of increased length in the orthography, we must base our decision for fortis status solely on voicelessness and the contrast between /g/ and /k/.[52] /kk/ is considered fortis due to the digraph expressing greater duration and voicelessness. /kg/ reflects the West Germanic lenis geminate stop /gg/. The spelling *gg* makes it still look like a lenis. The partial devoicing as expressed in *cg*: *mucgun*, however, makes it evident that a change is taking

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[51] Since final devoicing of velar sounds occurs quite consistently in the Tatian text, we consider cases, in which devoicing has not taken place, as exceptions due to analogy.

[52] Marginal support for increased length might be adduced from a few cases of scribal variation, when scribe γ uses the digraph *ch* for /k/: *uuirche 'faciam'* (γ 87,8), *folche* (γ 89,2), *uorsenchit 'versenken'* (γ 94,4). But see also Moulton (1944: 327), who attributes these spellings to an earlier spelling practice of *ch* before front vowels.

place.[53] Analogous to /pb/ in the labial order we consider /kg/ a phonemic sequence in transition from lenis to fortis.[54]

Velar Spirants

For the spirants we find *h hh ch.*

h occurs in initial, medial and final position, and also when followed by a consonant: *heim, herzen, sihit, hohan, sprehan, gisah, hôh, sprah, ih, mahtîg, naht, uuahsan.*

hh and *ch* occur only between vowels: *mihhil, rihhi, uuahhên, sprechantan, uueliche, lahhen.*

Although the historical origin is threefold (Gmc. /x/, Gmc. /k/ and WGmc. /xx/), we set up two phonemes, /h/ and /hh/.

/h/ occurs as *h* in initial and medial position, reflecting Gmc. /x/: *heim, sihit.*

/x/ occurs as *hh* and *ch* between vowels, and is occasionally simplified to *h*: *mihhil, mihilan, suochenti, suohet, (h)lahhen.* In these examples /x/ reflects Gmc. /k/ and WGmc. /xx/. When it is followed by a consonant and in

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[53] See part B. of this chapter.

[54] Valentin (1962: 346) considers /gg/ and /cc/ (his symbols) both to be fortes. Excluding a voiced-voiceless contrast between fortis phonemes, he assumes the contrast to be one of aspiration: /gg/ [kk] : /cc/ [kk']. According to our hypothesis, voiced geminates are lenis until increased duration and voicelessness become the auditorily prominent features. Following this the geminates assume fortis status. The dialect of the OHG Tatian has not yet reached that stage.

final position it occurs as *h*: *naht, mahtîg, gisah, hôh, sprah, sih, buoh, uuih-rouh.* Here it reflects both Gmc. /k/ and /x/.

/h/ is considered lenis due to its single spelling. The fact that intervocalic /h/ disappeared in several cases,[55] leads to the assumption that it was voiced intervocalically. We assume /x/ to be fortis due to its digraphic spellings *hh* and *ch* implying increased duration. Voicelessness seems assured by the symbols *h* and *c*, and the fact that /x/ never disappeared in intervocalic position. In final position the fortis-lenis contrast is neutralized.[56] This also applies to the position before consonants.[57]

Table of velar phonemes

Feature	Phoneme	Spelling		
		initial	medial	final[58]
fortis	/k/	k-/c-	-Ck/Cc-	-k/-c/-g
	/kk/		-kk/cc/ck/kc-	
	/x/		-hh/ch/h/hC-	-h
transitional	/kg/		-gg/cg-	
lenis	/g/	g-	-g-	
	/h/	h-	-h-	

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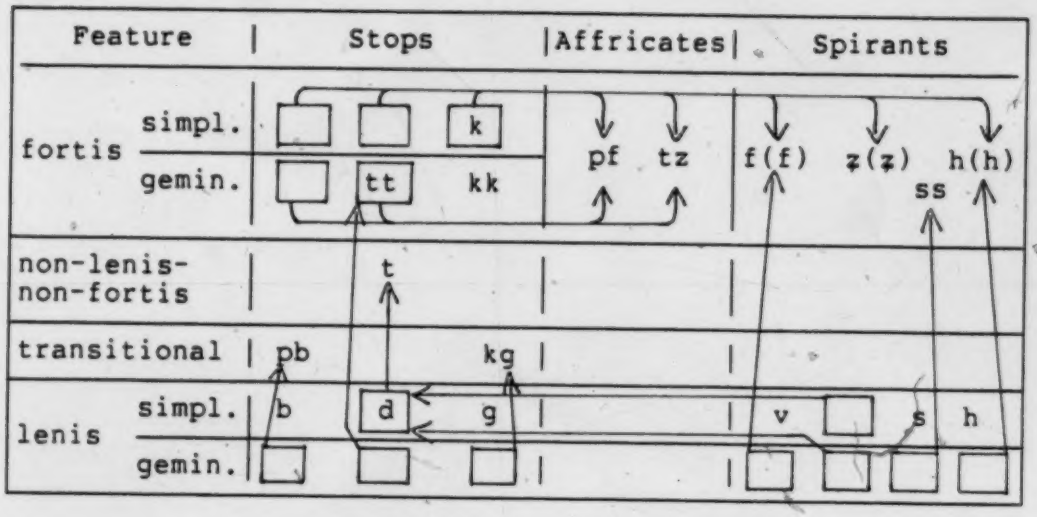
[55] Sievers (1960: XXXV) lists the following examples for loss of intervocalic *h*: *hoisten, hoan, giueo, giueen, fi(h)u, gisi(h)u.*
[56] See footnote 21 in part D. dealing with Isidor.
[57] See part C. of this chapter.
[58] For neutralization in final position see footnote 21.

Conclusion

Table of Tatian consonants



Note: The squares indicate positions that were filled in Germanic. The lines connect with the corresponding Tatian consonants.

The table above demonstrates that, parallel to Isidor, the change affecting the consonant system is connected with fortis. This is manifest in the shift of the tenues and the corresponding geminates to fortis spirants and affricates, and the change of the former lenis geminates toward fortis. We also find, in accordance with Isidor, that this shift was determined by increased duration. Although the general development proves to be the same as in Isidor, we notice

divergence in some areas:

1. WGmc. /þþ/ does not take the route expected. It merges with the reflex of Gmc. /þ/ > Tatian /d/ thus remaining on the lenis side. This is, however, attested by only one example in the text.
2. The West Germanic lenis geminate stops are changing from lenis to fortis. Former /dd/ has already completed this process, and former /bb/ and /gg/ are still in transition to fortis in both documents, but Tatian with *bb* and *gg* spellings attested seems more conservative than Isidor with no such spellings.
3. Former /d/ is rarely found initially as *d* (cf. Isidor regularly *d-*) and consequently former initial /þ/ has started to move on to become a lenis stop (Tatian *th~ð~d* versus Isidor *th*).
4. Contrary to Isidor, /pf/ is well established in the consonantal system of Tatian.

In comparison with Isidor it appears then, that in Tatian the development of the dental series is further advanced, whereas the labial and velar lenis geminate stops are slower in their development to become fortis.

The evidence gained from the Old High German Tatian is held therefore to be in support of the hypothesis, that the fortis-lenis opposition is the primary distinctive feature of the consonant system. Instability of voice, albeit less obvious than in Isidor, is an indication that voice contrast is not of primary importance to the system.

F. Orthographic Evidence for a Fortis-Lenis Opposition in the Old High German *Evangelienbuch* by Otfrid

The Old High German *Evangelienbuch* written by the monk Otfrid of Weissenburg in Alsace exists in three complete manuscripts and in parts of a fourth one. Otfrid completed his book between 863 and 871 A.D., as can safely be concluded from the three dedications that accompany his work. In the dedications Otfrid mentions Rhabanus Maurus of Fulda to be his teacher. Characteristic for Otfrid is the innovation of end rhyme in his verse, the origin of which is still disputed. The dialect of the manuscripts is South Rhenish Franconian as far as the consonants are concerned. This corresponds on the whole with the features of the language still spoken today in the region of Weissenburg.

Analysis of consonantal orthography
leading to a fortis-lenis phonemic system.[s'']

Labials

Labial Stops

We find the following spellings for the stops: *p b bb*. /p/ *p* occurs in initial position reflecting unshifted Gmc. /p/: *pad, palinza, pending, plegan, pluag*. Medially it occurs in loan words and a few times as the result of devoicing of /b/ caused by following *t*: *purpura*,

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[s''] The examples are from Erdmann 1882 (5th ed. 1965 by L. Wolff).

scorpion, warpta, zarpta.

/b/ *b* occurs in all positions: *bein, bluomun, scribu, giliubta, selbes, leb, selb, liob, grab, giscrib.* In final position *p* occurs a few times: *bileip, giscreip, lamp.* It occurs too infrequently to indicate final devoicing, and is therefore better explained as a spelling variation due to the absence of contrast in final position.

/bb/ WGmc. /bb/ remains unshifted and occurs as *bb* intervocalically: *sibbu, gisibbu, goto-webbi, insuebben, stubbi, ubbîg.*

We assume /b/ to be lenis based on its single spelling and the indication of voice in the symbol *b*. /p/ is considered fortis since it is voiceless and contrasts with /b/ in initial and medial position. There is no indication of increased length for /p/ in the orthography. /bb/ is assumed to be lenis, since the lenis spelling is consistent with one exception, *krippha*, which is interpreted as an affricate. In spite of this isolated occurrence it appears that, judging by the orthography, the WGmc. lenis geminate /bb/ has not even begun to shift from lenis to fortis.[••]

Labial Spirants and Affricate

For this group we find the following spellings: *v f ff ph pph pf*.

/v/ It reflects Gmc. /f/ and occurs as *f* in initial

[••] See pp. 56-60.

position, occasionally as *v*: *filu - vilu, ferit, fihu, fiure*. Between vowels it occurs mainly as *v*, a few times as *f*: *reve, zuival, diufal*.

/f/ It occurs in medial and final position. Medially following short vowel it occurs as *ff*, after long vowel, diphthong or *r/l* it occurs as *f*: *heffenti, offan, slâfente, ruafentes, diufi, werfan, helfa*. /f/ reflects Gmc. /p/ and WGmc. /ff/ (*heffenti*), which coalesced in Old High German. In final position only *f* occurs: *briaf, ref, scif, slâf*.

/pf/ The labial affricate occurs as *ph, pf* and *pph* in medial position: *kuphar, opheres, scepheri, limphit, nintslupfe, opphoron, krippha*. The symbols *ph* and *pf* are found to be in free variation with *f* when following *l*: *helpha - helfa, hilpf - hilf;* there is also variation with *p* in *limpit, gilumplih - limphit, intslúpta - nintslúpfe. krippha* is an exception in that it does not reflect WGmc. /p/ or /pp/, but WGmc. /bb/: OS *kribbia*. This is the more surprising, since all other instances of WGmc. /bb/ of this text occur as unshifted lenis geminate stops.''

We regard /v/ as lenis because of single spelling and the indication of voice in the symbol *v*. /f/ is considered fortis based on voicelessness and the indication of greater length in the digraph *ff*. In final position the contrast of fortis-lenis for the labial spirants is neutralized. /pf/ we

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'' Cf. pp. 56-60; 98, and footnote 4 on p.58.

consider to be fortis due to voicelessness and greater duration as is expressed by digraphic and trigraphic spelling.

Table of labial phonemes

Feature	Phoneme	Spelling		
		initial	medial	final[62]
fortis	/p/	p-	(-p-)	
	/pf/		-ph/pph/pf-	-pf/ph
	/f/		-v̄ff/v̄f/Cf-	-f
lenis	/b/	b-	-b- (-pC-)	-b (-p)
	/bb/		-bb-	
	/v/	f-/v-	-v/f-	

Dentals

For general comments on the dental development in Old High German we refer to pp. 71-72.

Dental Stops

For the simplex category we find the following spellings: *t d th*. Although *th* represents a spirantal sound, it is treated here together with the stops because its development is closely linked with the development of the stops.

/t/ Initially *t* occurs in loan words: *tunicha*, following *s*

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[62] For neutralization in final position see footnote 21 of this chapter.

in *stein*, and in medial and final position where it reflects Gmc. /d/: *fater, muater, uuorto, stetig, ziti, guati, brôtes, mit, brôt, friunt.*

/đ/ *d* occurs in all positions: *dohter, det, dag, doufen, drinkan, druhtîn, duah, nide, findan,fand, ward.* Initial *d* reflects Gmc. /d/ showing the occasional alternate spelling with *t*, medial and final *d* reflect Gmc. /þ/.

/đ/ *th* occurs only in initial position and reflects Gmc. /þ/: *thiarne, theru, thoh, thegana, thorf, thionôn, thenken.*

Our phonemic distribution implies that the dental change as it is outlined on pp. 71-72, is completed in medial and final position, whereas the orthography in initial position reflects the unshifted Pre-Old High German stage.[63]

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[63] Valentin (1962: 347) sets up only two phonemes: /th d/ and /t/, and assumes a *case vide* for the lenis stop due to a lack of stop allophones in the position after nasal. We disagree with this view, because there are sufficient examples in the text showing *nd*, e.g. *findan, ander, endi*, whereas the symbol rendering a spirant occurs initially as *th*.
Penzl (1964b: 177) provides support for Valentin's view, however, for different reasons: "morphemes ending in *-d* (never those ending in *-t*) rime with morphemes ending in *-f* and *-h*... e.g. *quad : sprah; ward : tharf*. These assonances of *d* with spirants make it extremely likely that Otfrid's medial and final *d* was a spirant rather than a stop. The orthographic evidence confirms this conclusion." As regards that latter point, Penzl (1964b: 171) relies on the influence of Romance orthography, where a voiced spirant in medial position was rendered with *d*: "It may have had this value in the orthographies of Tatian and Otfrid and of other OHG documents." This argument is not convincing since *th* was available to represent a spirant in initial position.
Penzl has changed his position since. He states (1971: 36, 85, 86) that the lenis dental spirant seems to occur only initially, and that orthographic *d* reflects a stop in all

We consider /d/ to be a lenis based on voice and single spelling indicating short duration. /t/ is assumed non-fortis-non-lenis due to voicelessness and short duration expressed by single spelling.[64] /đ/ is regarded as lenis due to its spirantal quality and short duration. (The *h* in the digraph *th* does not imply aspiration due to greater force of articulation, but expresses spirantal pronunciation.)

Dental Geminates

/tt/ WGmc. /dd/ occurs intervocalically as *tt*: *mitti, betti, thritto, bitten, giquettan.* In *gibeitta* and *firleitta* the geminate stop is the result of vowel syncope.

/tþ/ WGmc. /þþ/ occurs intervocalically as *tth* and *th*: *etthesuuer, etthesuuanne, mithont.*[65]

This sound is generally regarded as a spirant. Considering the fact that WGmc. /þþ/ becomes /tt/ also in Franconian at a later time, and that this change could

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[63](cont'd)positions. Historically /d/ corresponds to Pre-Old High German /đ/ in initial position, medially and finally to Pre-Old High German /þ/. Thus Penzl's more recent view supports our interpretation.

[64] Regarding the status of /t/ see part D. 'Dentals'.

[65] Geminate spelling is attested in manuscript P; elsewhere the reflex of WGmc. /þþ/ occurs shortened as *th*. Braune/Eggers (1975:§93,2) comments as follows: "Für gewisse Geminaten schreibt O gern das einfache Zeichen. Jedoch beweist das Metrum, dass dennoch konsonantische Länge vorhanden war." Also ibid. (§167,10) "Bemerkenswert ist, dass O in den bei ihm vorkommenden Wörtern (*mithont, ëthes*) stets *th*, nie die bei einfach inlautendem germ. /þ/ herrschende Verschiebung *d* hat; Hs. P hat die Formen mit *tth* als genauerem Ausdruck der Gemination, was O graphisch oft vernachlässigt." Note, however, that this *th/tth* variation between manuscripts V and P is not necessarily a question of neglect, but may well be due to the P-scribe's dialect being different from Otfrid's.

possibly have gone directly from a long spirant to a fortis stop, thus bypassing the stage of /dd/,[‘‘] we shall interpret the spelling *tth* as representing a voiceless stop [t] plus a voiceless spirant [þ]. This affricate is then regarded as a transitional phoneme on its way to a fortis stop. We consider /tt/ to be fortis due to voicelessness and greater duration as is indicated in the digraph.

Dental Spirants and Affricate

For these we find the following spelling: *s ss z zz.*

/s/ It occurs as *s* in all positions: *sun, lesan, was.*

/ss/ It occurs intervocalically only: *missen, irstantnissi.*

The orthography of Otfrid's *Evangelienbuch*, like the Tatian translation, does not draw a distinct line between the dental spirant and the affricate. For a clear phonemic distribution we must rely on comparative historical evidence.

/z/ The spirant occurs as *z* intervocalically and in final position. Occasionally it occurs as *zz* in medial position when preceded by a short vowel: *lâzan, suazi, hiazi, uuazar : uuazzar, ezan : ezzan, lâz, saz.*

/tz/ The affricate occurs as *z* initially, medially after consonant, and finally: *zi, zito, herzen, salz, scaz.* Intervocalically it occurs as *zz*: *sizzent* (but also *sizen*), *nuzzi, hizza.*

‘‘ Cf. Franck (1909: 122,§95).

We consider /ss/ to be fortis due to its digraphic spelling and the implication of voicelessness expressed by the symbol S. It contrasts with intervocalic /s/ which is regarded as lenis, because of its single grapheme. Although voice is not indicated in the orthography, we assume a tendency to voicing in voiced surroundings, guided by the fact that Proto-Gmc. /s/ became voiced under conditions of Verner's Law, and the phonetic realization of NHG /s/ in voiced surroundings. We regard /z/ and /tz/ as fortis phonemes judging by greater duration expressed by digraphic spelling. Voicelessness is not obvious in the orthography. However, the merger of /z/ with /ss/ in Middle High German vouches for the absence of voice at that time.

Table of dental phonemes

Feature	Phoneme	Spelling		
		initial	medial	final
fortis	/tt/		-tt-	
	/tz/	z-	-Cz-/-zz-	-z
	/z/		-z- (-V̊zz-)	-z
	/ss/		-ss-	
transitional	/tþ/		-tth/th-	
non-fortis-non-lenis	/t/	(t-) st-	-t-	-t
lenis	/d/	d-	-d-	-d
	/đ/	th-		
	/s/	s-	-s-	-s

Velars

Velar Stops

For this group we find the following spellings: *k c kk g gg gk*.

/k/ *k* occurs initially: *kurt, kalt, kiusan, kind;* medially and finally when preceded by a consonant: *uuolko, drenken, dunkal, thankôn, uuirken, scalk, thank.* In manuscript F *c* occurs occasionally in variation with *k*. /k/ reflects Gmc. /k/.

/kk/ WGmc. /kk/ occurs in intervocalic position as *kk, ck, gk, k: nidarscrikke, zukke, nackot, nakot, irquickit, irquigken.*

/g/ Gmc. /g/ is reflected by *g* in all positions: *guat, eigi, mag, sang*. Only occasionally is final /g/ devoiced, particularly when preceded by liquida or nasal. It is found more frequently in MS F: *gank, gifank*.

/gg/ WGmc. /gg/ is reflected unshifted by *gg* in intervocalic position: *hugget, leggen, analiggen, luggên*.

We consider /g/ to be lenis judging by its single spelling and the implication of voice in the symbol *g*. /k/ is assumed fortis due to voicelessness as expressed by the symbol *k*. The orthography does not indicate increased duration. In our view, however, increased duration is presupposed only where the shift took place, therefore the orthography supports the hypothesis. (In High Alemannic where initial Gmc. /k/ shifted, the orthography again faithfully indicates the lengthened sound: *cch*, etc.). /kk/ is considered fortis because of voicelessness and increased duration. /gg/ reflects lenis WGmc. /gg/ in its unshifted state and is therefore assumed to be lenis.

Velar Spirants

The spirants are reflected in the orthography by *h hh ch*. *h* occurs initially, medially and finally. *hh* and *ch* occur only in intervocalic position. Since the orthography does not clearly indicate the phonemic distribution, we must rely on historical comparative evidence. The velar spirants are reflexes of Gmc. /x/ and Gmc. /k/, which leads us to set up two phonemes: /h/ reflecting Gmc. /x/, and /x/ reflecting

Gmc. /k/.

/h/ *hanton, hiar, sahi, fihu, uuihi.*

/x/ *luchun, uuoroltrichi, guallichi, michel, mihhiles, mihiles.* Finally and before consonant only *h* occurs: *sprah, sah, ih, buah, zuht, mahtig, naht.* This implies that in these positions the contrast between /h/ and /x/ is neutralized. Guided by analogous cases, we infer that contrast was lost when sounds developed, which, in terms of physical properties, resembled fortis sounds.''

We assume /h/ to be lenis judging in part by its single spelling. Voicing in voiced surroundings is possible, but not evident in the orthography. In intervocalic position it contrasts with /x/, which is considered fortis in keeping with its digraphic spelling and voicelessness expressed in the symbols *ch* and *hh*.

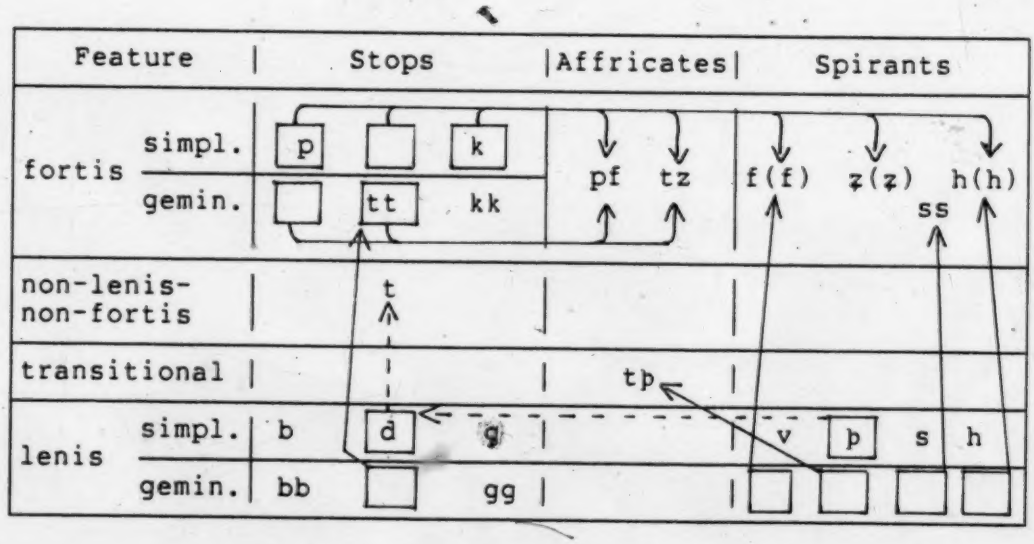
'' Cf. footnote 21 of this chapter, and part C. of this chapter.

Table of velar phonemes

Feature	Phoneme	Spelling		
		initial	medial	final**
fortis	/k/	k-	-Ck-	-Ck
	/kk/		-kk/ck/gk/k-	
	/x/		-ch/hh/h/hC-	-h
lenis	/g/	g-	-g-	-g/-Ck
	/gg/		-gg-	
	/h/	h-	-h-	

Conclusion

Table of Otfrid consonants



** For neutralization in final position see footnote 21 in this chapter.

Note: the squares indicate positions that were filled in Germanic. The lines connect with the corresponding Otfrid consonants.

The table of consonants above leads us to the same overall conclusion found in Isidor and Tatian: (1) that the change of consonants is connected with fortis, and (2) that voice contrast assumes a secondary function.

These overall findings differ from the results found in Isidor and Tatian:

(1) in that the change of former lenis geminates is less advanced in Otfrid. Whereas former lenis /dd/ completed the shift to fortis /tt/, and former lenis /ff hh/ merged with fortis /f/ < Gmc. /p/ and fortis /x/ < Gmc. /k/, former /bb gg/ appear unaffected by the change and /þþ/ has just begun to move toward fortis.

(2) The development of Gmc. /d/ > /t/ and Gmc. /þ/ > /d/ lags behind in initial position.

These delays support the widely held view that the consonantal changes found in Rhenish Franconian documents are the result of an as yet incomplete spread from Bavarian and Alemannic.'' These delays appear, however, less weighty in the light of the changes that have taken place: the fortis stops have shifted into the new categories of fortis affricates and spirants, the latter merging with the

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'' For more details see Brinkmann (1965: particularly 136-149).

reflexes of former lenis geminate spirants, and lenis /dd/ has become fortis /tt/.

G. Orthographic Evidence for a Fortis-Lenis Opposition from Notker

Notker III, also called Notker Teutonicus, lived from the middle of the tenth century until 1022. A monk of St. Gall, he translated standard Latin texts into the vernacular and often added exegetical commentaries in German. Aside from biblical topics, creeds and prayers, he dealt with philosophical matters such as *De Nuptiis Mercurii et Philologiae* by Martianus Capella, *De Consolatione Philosophiae* by Boethius, and *Categories, De Interpretatione* of Aristotle. Characteristic for some of Notker's writings is his Latin-German mixed prose, which reflects the didactic orientation of his works. His German is characteristic of Alemannic. A feature typical for the orthography in the manuscripts attributed to Notker and his school is the 'law of initial consonants' (*Notkers Anlautgesetz*). It is a systematic alternation between *b d g* and *p t k(c)* for Gmc. /b þ g/ in morpheme-initial position. The letters *b d g* occur when they are preceded by a voiced phoneme, i.e. the vowels, the nasals *m n*, and the liquids *l r*. These letters are replaced by *p t k(c)* when they are preceded by a pause or by a voiceless phoneme, i.e. the stops, spirants and

affricates. A similar alternation, though less regular, takes place between *u* and *f* for Gmc. /f/. In terms of fortis-lenis this means that Notker's spelling practice reflects the use of allophonic variants of lenis phonemes in cases where the opposition fortis-lenis was suspended. Thus Moulton (1979: 250) arrives at this formulation of the *Anlautgesetz*:

> (1) In those syntagmatic positions where the opposition lenis ≠ fortis was operative, he wrote *b, d, g, v* for the lenis phonemes, and *p, t, k(c), f,* for the fortis phonemes. (2) In those syntagmatic positions where the opposition lenis ≠ fortis was suspended, he generally wrote the letters *p, t, k(c), f,* and he did so not only (a) in a cluster of obstruents, but also (b) after pause.

Analysis of consonantal orthography leading to a fortis-lenis phonemic system.[70]

Labials

Labial Stops

For the stops we find the following spellings: *p b pp.* /b/ Initially *b* and *p* alternate systematically as described in Notker's *Anlautgesetz*: *sô bedárf - corpus pedárf, iro*

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[70] The examples are taken from *Die Schriften Notkers und seiner Schule.* Erster Band, 1882, Paul Piper (ed.).

bezéren - mit pézerûn.

In medial and final position only *b* occurs: *hábe, scrîben, gében, lîeb, sélb, stáb.*

/p/ Non-alternating *p* occurs rarely, in loan words and in the cluster *sp*: *paradys, púrpura, spîegel.*

/pp/ It occurs as *pp* intervocalically: *sîppun, úppîg.*

We consider /b/ to be lenis in keeping with single spelling and the indication of voice implied by the symbol *b*. /p/ has a low functional load. Nevertheless it is to be regarded as fortis,'' since it contrasts with lenis /b/ in initial position. /pp/ is considered fortis according to our analysis of the geminate stops: the digraph implies voicelessness and increased duration. It reflects the completed shift from lenis WGmc. /bb/ to fortis OHG /pp/.

Labial Spirants and Affricate

For the spirants we find the following spellings: *u f ff.*

/v/ In initial position *u* alternates with *f* according to the *Anlautgesetz*, however, not as consistently as the stops: *mán uerstán - îh ferstán, uîlo - fîlo, âne uógales - fógela, sîchen fánt.* It reflects Gmc. /f/.

In medial position only *u* occurs: *zuîualt, tîeuales, óuene.* It does not occur finally.

/f/ It occurs as *f* and reflects non-initial Gmc. /p/ and

'' See part C. of this chapter regarding fortis status of /p/ in a cluster.

final Gmc. /f/. Following short vowel it is frequently spelled *ff*: *hélfen, uuérfen, tîefo, tóufen, scâf, ûf, fînf, tréffen, óffen, scaffôta.*

/pf/ The labial affricate occurs medially and finally as *pf* and reflects Gmc. /p/ and WGmc. /pp/: *scépfen, trópfo, ópfer, ápfel, chrîpfa, chópf, slîpf.*

There remains non-alternating *f* in initial position: *fád, flánza, flégen, fáfo, fîfa.* Guided by the spelling alone, we could assign these occurrences to the phoneme /f/.[72] This initial *f* seems puzzling, however, when compared with the affricate spellings of later Alemannic documents. Since Gmc. /p/ is known to have passed via [pf] to [f], and not via [f] to [pf], it seems more logical to assume an affricate in initial position for Notker. Thus we assign non-alternating initial *f* to the phoneme /pf/.[73] Our decision does, however, not rule out that *f* could well have reflected the real pronunciation.

We regard /v/ as lenis due to its single spelling and the implication of voice in the grapheme *u*. It is in contrast medially with /f/ which is considered fortis by virtue of the digraphic spelling in position after short vowel, and the voicelessness indicated by the symbol *f*. We consider /pf/ to be fortis because of its digraphic spelling

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[72] This is Valentin's interpretation (1962: 348); he restricts his view, however, to instances of initial *f* before *l* as in *flánza, flégen*, and does not comment on initial *f* before vowel as in *fád, fáfo*, etc.

[73] See Braune/Eggers (1975:§131,4) for the representation of /pf/ by *f* being characteristic for Alemannic. See also Penzl (1971:§9,13c).

which implies increased duration, and because of its voicelessness indicated by the symbols *p* and *f*.

Table of labial phonemes

Feature	Phoneme	Spelling		
		initial	medial	final[74]
fortis	/p/	p- (sp-)	-p-	
	/pp/		-pp-	
	/f/		-Cf/V̆f/V̆ff-	-f
	/pf/	f-	-pf-	-pf
lenis	/b/	b-/p-	-b-	-b
	/v/	u-/f-	-u-	

Dentals

Dental Stops

For the dental stops we find the following spellings: *t d tt*.

/d/ Parallel to the labial stops *d* and *t* alternate systematically in initial position according to the *Anlautgesetz: dîe dîngolîh - îst tîngolîh, uuîder démo - mît témo, âne dáz - îst táz*. Medially and finally only *d* occurs: *uuîder, álde, chéden, rédo, fédera, uuárd, sîd, léid, uîd, lîd*. /d/ reflects WGmc. /þ/.

/t/ Non-alternating *t* in initial position reflects WGmc.

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[74] For neutralization in final position see footnote 21 of this chapter.

/d/: *tágâ, tûot, táta, túged, tôd.* It also occurs medially and finally: *strîtodes, tâte, tôti, hûoten, mît, mût, strît, sát, nîeht.*

/tt/ The dental stop occurs geminated as *tt* between vowels: *féttâh, bétte, mîtte.*

We consider /d/ a lenis phoneme as is evident from its single spelling and the implication of voice in the symbol *d*. /tt/ is considered fortis due to the digraph *tt* which implies increased duration and voicelessness. The orthography for /t/ indicates a short and voiceless sound, which means that it is neither fully fortis nor lenis, and therefore assumes special status.[75]

At this point the question arises whether the graphemic overlap of *t* in *tágâ* and *(îst) táz* implies phonetic sameness. Since *t* in *tágâ* belongs to non-fortis-non-lenis /t/, and *t* in *táz* belongs to lenis /d/, we assume voiceless aspirated pronunciation for *t* /t/ vs. voiceless, but nevertheless lenis pronunciation for *t* /d/. This distinction is of course not borne out in Notker's orthography. Considered in isolation the *Anlautgesetz* is well interpreted as the suspension of the fortis-lenis contrast in certain syntagmatic position (Moulton 1979). This, however, appears to be an oversimplification when viewed in a larger historical setting, and would better be termed a weakening of the fortis-lenis contrast. If indeed the graphemic overlap indicated a morphophonemic overlap, we would expect

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[75] See discussion on dental change on pp. 71-72.

to find traces of this phenomenon in later Alemannic documents. This is, however, not the case. We consider therefore Notker's orthography (*Anlautgesetz*) to represent an excessively systematized rendering of a weakened contrast in these syntagmatic positions.

Spirants and Affricate

We find them under the following spellings: *z zz s ss.*

/tz/ The affricate occurs as *z* in initial and final position and following *l/r*: *zéso, zîl, zúnga, hólz, slîz, suárz, smélzen, hérza;* intervocalically it occurs as *zz* and *z*: *sézzen, uuîzzîg, rézzon, âzzen, chrûze, réizen.*

/z/ The fricative occurs nearly always as *z* in intervocalic and final position: *scúzela, uuázer, ézen, bézer, slóz, scúz, uuáz, uuîz, grîez;* but *éz(z)ih.*

/s/ It occurs as *s* in all positions: *sîechen, sólta, sîs, uuîsâ, réisôt, uuésen, zîns, sús, rós.*

/ss/ It occurs between vowels as *ss*: *mîsselîh, únguîssi.*

We consider /tz/ to be fortis because length is indicated in the spelling variant *zz*. /z/ we also consider fortis, although orthographic evidence for increased duration is slim. Voicelessness for both /tz/ and /z/ is not apparent in the orthography. In Modern German, however, reflexes of OHG /tz/ and /z/ are voiceless. We also refer to

the analysis of /tz/ and /z/ of Isidor,[74] where voicelessness is borne out in the orthography. We regard /s/ as lenis, since it occurs in single spelling only. Voicing is possible, but not clearly indicated in the orthography. It contrasts in intervocalic position with /ss/, which we consider fortis because of its digraphic spelling and its indication of voicelessness.

The three step change of the dental group is completed in Notker:

(1) Gmc. /t/ shifted to the corresponding spirant or affricate,

(2) lenis Gmc. /d/ became short voiceless /t/,

(3) lenis Gmc. /þ/ became lenis /d/.

Also completed is the shift of the former lenis geminate dental stop and spirant to the fortis geminate stop.

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[74] Cf. pp. 71-72.

Table of dental consonants

Feature	Phoneme	Spelling		
		initial	medial	final
fortis	/tt/		-tt-	
	/tz/	z-	-zz-/-Cz-	-z
	/z/		-z(z)-	-z
	/ss/		-ss-	
non-fortis-non-lenis	/t/	t-	-t-	-t
lenis	/d/	d-/t-	-d-	-d
	/s/	s-	-s-	-s

Velars

Velar stops

The velar stops occur in the following spellings: *g k kk cc.*

/g/ The alternation between *g* and *k* reflects the implementation of the *Anlautgesetz: dîsemo gechôse - tîz kechôse, sô guîsse - partes kuîsse.* Medially and finally only *g* occurs: *flîegen, sûgen, sâgen, ségel, búrg, mág, uuîhselîg.* /g/ reflects Gmc. /g/.

/kk/ The velar stop occurs geminated in intervocalic position as *kk* or *cc*: *sékko, lúkke, eruuékken, glóccûnioche.* It reflects WGmc. /gg/.

We consider /g/ lenis since it occurs in single spelling and the grapheme *g* expresses voicing. /kk/ is

considered fortis as is evident from its digraphic spelling, which also indicates absence of voice.

Velar Spirants and Affricate

The spirants are reflected in the orthography as *ch* and *h*. We are dealing with the reflexes of WGmc. /x/ and /k/.

/h/ It reflects WGmc. /x/ and occurs initially and intervocalically as *h*: *hâr, hânt, hálten, hôrn, hûs, héilig, séhen, hóhi, sláhen.*

/x/ It reflects WGmc. /k/ and occurs medially as *ch* and finally as *h*: *rîcho, scálcho, uuérches, înnelîcho, sácha, tûoh, îh, háh, sláh, bûh, scálh, uuérh, înniglîh.* We also find WGmc. /hh/ merged with /x/ as it occurs in *láchên.*

/cch/ The velar affricate occurs initially as *ch* reflecting WGmc. /k/, and between vowels as *cch* reflecting WGmc. /kk/: *chúning, chómen, chérza, chînt, chléine, chnéht, chnîu, chórn, zúcchen, gerúcchet, dîccho, geréccheda.* We also assume *ch* after nasal to represent an affricate because of examples such as *dánches - dáng, trînchen - tráng 'Getränk', báng* 'bench', where *-ng* in final position indicates a stop vs. final *-lh, -rh,* which indicate a spirant: *scálh - scálches, uuérh - uuérches.* It appears more likely that a final stop relates to an affricate through morphophonological alternation than to

a spirant.[17]

The phonetic interpretation of the grapheme *ch* is problematic. Penzl (1971) assumes spirant initially and medially, but an affricate when following a nasal consonant. In an earlier article[18] he suggests, however, that *ch* in initial position might be considered an affricate parallel to *ch* following a nasal. This latter view is shared by Simmler (1976: 60), partly because of the analogous distribution of the labial and dental affricates assumed in initial position. Valentin does not see any grounds for justifying a velar affricate at all (1962: 348). For the present purpose it is not crucial whether Gmc. /k/ shifted to an affricate or a spirant, since both interpretations allow the conclusion that increased duration of the fortis velar stop resulted in new fortis velar categories. For the sake of systematic parallels we assume initial *ch* to indicate an affricate: /pf/ *f-*, /tz/ *z-*, /cch/ *ch-*. Guided by its single spelling we consider /h/ to be lenis. In addition we expect *h* to be voiced in intervocalic position. /h/ contrasts with /x/ and /cch/ which are both assumed to be fortis due to digraphic spelling and voicelessness indicated by their orthographic symbols.

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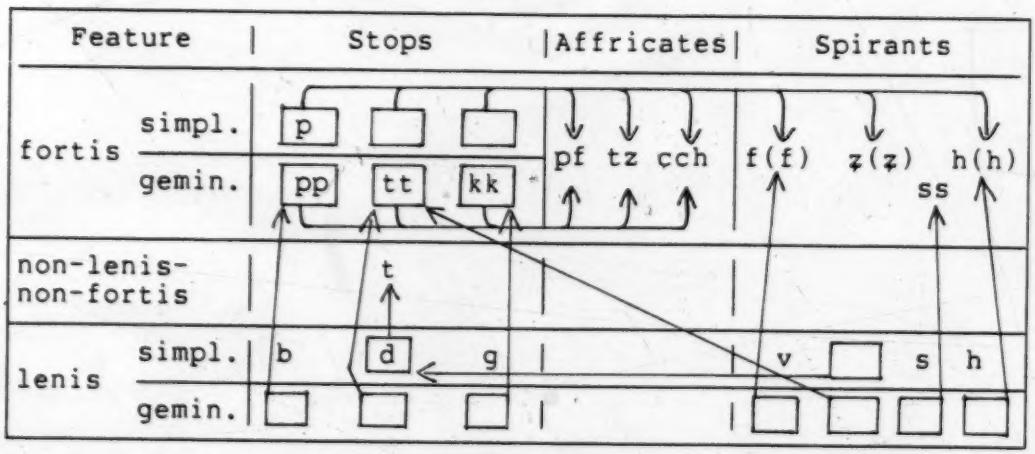
[17] Cf. Penzl (1971: 103).
[18] Penzl (1968: 146).

Table of velar phonemes

Feature	Phoneme	Spelling		
		initial	medial	final''
fortis	/kk/		-kk-,-cc-	-h
	/x/		-ch-	
	/cch/	ch-	-cch-,-Nch-	
lenis	/g/	g-/k-	-g-	-g
	/h/	h-	-h-	

Conclusion

Table of Notker consonants



Note: The squares indicate positions that were filled in Germanic. The lines connect with the corresponding Notker

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'' For neutralization in final position see footnote 21 of this chapter.

consonants.

The consonant system of Notker is affected by the same changes as those of the three documents examined previously. The table above demonstrates the completion of the dental change and of the change that is connected with fortis. The lenis geminate stops and former /þþ/ have become fortis geminate stops, the remaining lenis geminate spirants have become fortis spirants and have merged with the reflexes of the former fortis stops. The new fortis category of affricates includes the velar order.

We now have a set of lenis simplex stops in opposition with fortis geminate stops and affricates. This regularity is broken by the oddity of non-fortis-non-lenis /t/ and fortis /p/ which, however, is represented by loan words only. Another imbalance consists in having two fortis spirants in the dental order, /z/ and /ss/; as later evidence shows, the tendency here is to merge with the result of fortis /ss/ in contrast with lenis /s/ in Middle High German.

H. Conclusion on Old High German

In summary it can be stated that the changes which began in the Pre-Old High German period were aimed at rearranging the Germanic consonant system toward a structure which continued to be based on a fortis-lenis contrast. This was achieved by lengthening the Germanic fortis consonants

and a simultaneous reduction of the function of voice contrast in the system.

The development of the geminates in Old High German is strong evidence for a fortis-lenis contrast in Germanic. We assume the fortis pronunciation to be the basis for the lengthening process which induced the changes in the Old High German consonant system. This lengthening, which became the decisive auditory criterion for fortis in Old High German, was incompatible with lenis. Hence former lenis /bb dd gg/ were forced to change to fortis by virtue of their inherent duration.

The development of Gmc. /þþ/ in the various Old High German dialects emphasizes the decisive role of duration with regard to the consonantal changes. In Tatian *federacha* a shortening of the Germanic geminate led to a lenis sound; in Otfrid's *mithont* it is not quite clear whether shortening is leading to a lenis, or whether maintained length, as is seen still in Otfrid's *etthesuuer*, is leading to a fortis; in *fethdhahha* Isidor duration is maintained while devoicing is taking place, which points to the final result of a fortis geminate as found in Notker *féttâh*.

As a further indication that lengthening preceded the shift, we may mention some of the results from Steche (1937). While discussing the material collected, Steche

makes mention[**] of an inconsistent use of single and geminate spelling for East Germanic tenues as is found in Latin and Greek rendering of Gothic proper names. Some of the examples are:

Gripas - *Grippas* (Prokopios)

Witigis - *Wittigis* (coins)

Ouakis (Prokopios) - *Waccenem* (Cassiodor)

Rekithaggos (Prokopios) - *Riccitanc* (document Ravenna).

Steche suggests that the geminate spellings are an attempt to express affricates. We prefer to see them as an implication of Roman and Greek writers perceiving postvocalic tenues longer in these Germanic proper names than would be expressed by the single spelling of the letter. We therefore consider these geminate spellings as evidence for the stage of lengthening the Germanic fortis single stops before the shift to affricates or spirants had been reflected in the orthography.

'Final devoicing' of consonants is known to be a feature of the Middle High German phonology. We find, however, traces of it in the Old High German documents. The evidence varies with the dialects and the scribes. It seems at that period still unpredictable when final devoicing would be reflected in the orthography. The devoicing is a step towards a merger with the corresponding fortis phonemes, which is a fact of Modern German. We shall see in Chapter IV on Old Norse Assimilation that devoicing is again

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[**] Steche (1937: 42-43).

a necessary precondition for a shift to fortis.

IV. OLD NORSE

A. Introduction

In the forgoing chapters we examined Gothic as the representative of Proto-Germanic, and several dialects of Old High German representing that group of West Germanic which underwent the High German consonant shift. The result in both cases proved to be positive for our fortis-lenis theory.

In this chapter we shall turn our attention to the North Germanic languages.'

The period of Old Norse extends over more than a thousand years with its earliest records in runic inscriptions from about 200 A.D. to the classical period of Old Icelandic writing 1150 - 1300. Not only did historical relationships change during this long period, but we also are confronted with different writing systems. We therefore feel that it is justified to treat Runic Norse representing the oldest period seperately from Old Icelandic, which represents the younger period.

We shall be following the same method in establishing the phonemic structure of Runic Norse and Old Icelandic as

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' The terms North and West Germanic are used to reflect not only a geographical division but also a rough line of demarcation of independent linguistic development. Gothic may well be labeled East Germanic. We have avoided this term, however, because the evidence of Gothic was seen here in a larger context, namely as representing Proto-Germanic. Regarding the history and problems of the classification of the Germanic languages and for further references see H. L. Kufner 1972.

in the previous chapters. We shall base our findings on the orthography of the documentary evidence supplemented by findings from comparative method. Then we shall examine the validity of fortis-lenis as the primary opposition of the consonant system.

As a starting point we shall be using the section on Old Norse by W. G. Moulton (1954). As already pointed out for Gothic, Moulton's analysis of the consonant systems of the Germanic dialects is most widely accepted. In addition we have consulted E. Antonsen (1975), W. Krause (1972) and A. Noreen (1970). Following that we shall develop our own argument in support of the fortis-lenis theory.

B. Phonemic Analysis of Runic Norse

Runic inscriptions in the old Futhark, consisting of 24 graphs, extend in time from the third to the eighth century A.D. They were found mainly in Scandinavia. During that period North Germanic is still considered to be a relatively homogeneous language. It was not until the Viking period that dialect differences in North Germanic increased notably and became manifest in the inscriptions. During that period a shorter version of the runic alphabet, the so-called Younger Futhark consisting of only 16 runes, came into use. We base our analysis, in agreement with Moulton (1954), on inscriptions in the Older Futhark. Some shortcomings of the runes which have a bearing on the phonological analysis need

to be mentioned. 1. There is no evidence for consonant length, since long consonants are designated by a single rune. 2. We cannot draw conclusions from spelling clusters, since spelling irregularities such as inversion of two runes and the omission of runes are fairly common.

Analysis of the Labials

Although the evidence is scanty for the labial order we can set up with Moulton (1954) three phonemes /b p f/.

/b/ *b* occurs initially and medially: *birg, bArutR, arbija, gibu.*[2] In final position, however, we find *f: gaf*. This morphophonemic alternation provides evidence for spirantal allophones of /b/ in postvocalic position, which had become devoiced to [f] finally and was reassigned to phoneme /f/.

/p/ There are no examples for runic /p/ in actual words; it only occurs in futhark listings.

/f/ It occurs in all positions: *faihido, -wulafa, -wulfs, after, gaf*.

Moulton assumes voice to be the primary distinctive feature contrasting voiceless /p/ and /f/ with voiced /b/. He assumes occlusion to be the secondary distinctive feature, contrasting /p/ with /f/. Thus Moulton arrives at the same formula for Runic Norse as for Gothic: (p : f) : b.

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[2] The examples cited in this chapter are from W. G. Moulton (1954, 1972) and A. Noreen (1970).

Our argument in support of fortis-lenis as primary distinctive feature is parallel to the one made for Gothic and rests on similar evidence. The voice contrast is neutralized in final position by the automatic alternation between /b/ and /f/: *gibu*, *gaf*, which implies a serious disruption of the system if it is based primarily on voice contrast. A fortis-lenis contrast as primary relegates the disruptive effect to the secondary level, where voice contrast appears within the lenis side : lenis /b/ and /f/ contrast with fortis /p/. Now the morphophonemic switch involves only one node and not the entire subsystem.[3]

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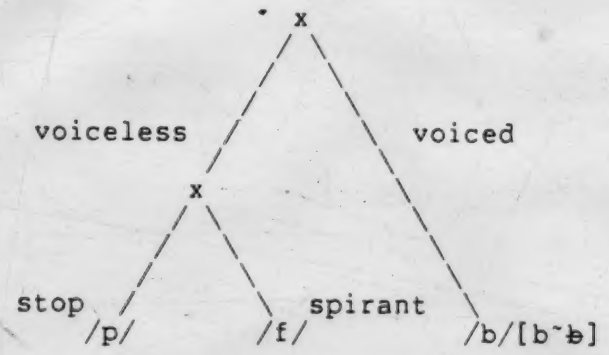
[3] For a more detailed discussion see Chapter II. of this thesis dealing with the Gothic evidence.

This is illustrated in the two tree-diagrams below:

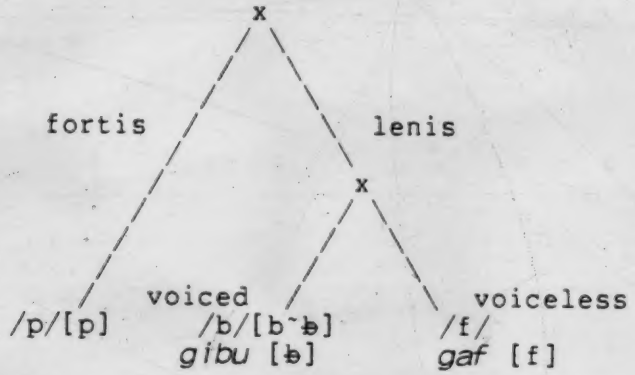
Moulton's analysis for Runic Norse

Labial order



Fortis-lenis analysis for Runic Norse

Labial order



Analysis of the Dentals

The evidence for the dental order is less scanty. We have a three-way contrast between a voiceless stop /t/, a voiced obstruent /d/ with stop and fricative allophones, and a voiceless fricative /þ/.

/t/ It occurs in all positions: *tawido*, *sate*, *glanta*,

holtijaR, wurte, haitinaR, þat, lant.

/þ/ It occurs in all positions: *þar, skinþale, Afunþ, owulþu-, laþu, bariutiþ.*

/d/ It occurs in all positions: *dagaR, ungandiR, -staldiR, uilald, talido, alawid.*

Evidence for spirantal allophones comes from *bariutiþ* < */briwtid/,[4] where the dental in final position had become devoiced by the 7th century. *d* in *alawid*, on the other hand, is presumably still a voiced spirant since this evidence dates from the 5th century before the devoicing of final stops and spirants. Hence the final, postvocalic distinction /d/ : /þ/ is lost by the seventh century.

Moulton assumes the same structure for the dentals as for the labials, namely voice as the primary distinctive feature, and occlusion as the secondary feature: (t : þ) : d. Again we claim that the primary distinctive feature fortis-lenis is to be preferred over the voice contrast proposed by Moulton. Fortis /t/ contrasts with lenis /d/[d/ɗ] and /þ/[þ].

Analysis of the Velars

The two-way contrast in the velar order allows us to set up the two phonemes /k/ and /g/.

/k/ *k* occurs in all position and represents a voiceless

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[4] Moulton (1954: 16). But cf. also Krause (1971 :42) in defense of the view that *bariutiþ* goes back to a voiceless fricative /þ/.

velar stop: *-kurne, skaþi, wurkio, laukaR, sAkse, fiskR, ek.*

/g/ *g* occurs in all positions: *-gastiR, dagaR, iuþingaR.*

We assume with Moulton three allophones for /g/: (1) A voiced stop [g] initially, after nasal and in gemination: *gaf, -gastiR, iuþingaR, lAgi* (> OI *leggi*), (2) a voiced fricative [ɣ] in non-final position postvocalically and after *l* or *r*: *dagaR, ArAgeu* (the second *'A'* is epenthetic),(3) a voiceless fricative [x] in final position as the result of the final devoicing of stops and spirants in the 7th century: *birg* [x].[5]

The assumption of three allophones for /g/ is supported only by the later Old Icelandic evidence.[6] Krause cautions that Gmc. /b d g/ may well have been voiced fricatives in all positions for quite some time, since it is uncertain when /b d g/ developed stop allophones in initial position, after nasal, and in gemination.[7] In other words, the allophonic distribution of /b d g/ in Old Icelandic may not be transferred to Runic Norse without reservation.

/h/ It occurs in all positions: *horna, wlIha-, fAlAh, worahto, faihido, dohtriR, aih.*

For /h/ Moulton assumes a separate glottal order for the following reasons:

1. The devoicing of postconsonantal voiced spirant [ɣ] in final position did not produce /h/, which would have

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[5] See Moulton (1954: 10-11).
[6] Ibid. p. 16.
[7] Krause (1972: 38-39).

been lost through subsequent voicing, but is assumed to have resulted in allophonic [x], since subsequent voicing returned it to /g/[ɣ]: Pre-OI */swálg/[ɣ] > [swalx] > OI *sualg*[ɣ].

2. Postvocalic voiced spirant [ɣ], however, after devoicing to [x], underwent phonemic change and became /h/. Subsequent voicing did not return it to /g/[ɣ], but resulted in its loss.

We therefore have a two-way contrast in the velar order /k/ : /g/, for which Moulton assigns the structural contrast of voice, whereas we regard the contrast as one of fortis-lenis. /h/ has no structural counterpart. It is, however, considered a lenis phoneme due to its lenis characteristics: spirantal pronunciation, tendency to become voiced, and/or lost.

There remain /s R r/ to be discussed. In Proto-Germanic [z] and [s] were voiced-voiceless allophones and, as we stated for Gothic, due to their phonetic characteristics they are to be considered lenis without fortis counterparts. The interpretation of Runic Norse *R* is problematic: Since it is found in place of Gmc. /z/, it may be nothing other but [z].[8] The other possibility is that a phonemic change has taken place and that Runic Norse *R* now represents an *r*-type sound (apical trill) or a stage, intermediate between [z] and [r], still kept separate from old /r/ (uvular trill). /R/ and /r/ will eventually merge and appear as one phoneme

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[8] This is Antonsen's view (1975: 1-2).

/r/ in Old Icelandic. For our purpose the interpretation of Runic Norse *R* is of no consequence, since either way /R/ represents a lenis sound without fortis counterpart.

/s/ It occurs in all positions: *sakse, stAinAR, satido, gisai, was.*

/R/ It occurs in medial and final position: *runAR, aRina, hroRaR, irilaR, dohtriR.*

/r/ It occurs in all positions: *regu, runo, bera, Hari-, birg, lebro, þar.*

The structural analysis for Runic Norse appears to be the same as for Gothic, differing only in the allophonic distribution. This is not surprising if one considers that Bible Gothic is contemporary with at least part of the Runic Norse evidence. Both Gothic and Runic Norse are phonologically still closely related to what we consider Germanic. Thus the evidence procured from Runic Norse supports the hypothesis of fortis-lenis in the same way as Gothic. As shown in the diagrams applying to the labial order, voice as primary distinctive feature spreads the effect of the morphophonemic alternation over the entire subsystem, whereas with a fortis-lenis contrast as primary distinctive feature the morphophonemic alternation involves only the lenis side. This is also the case for the dental order. For the velar order the fortis-lenis contrast applies as well as the voice distinction. Thus for reasons of simpler overall

applicability fortis-lenis as primary distinctive feature is to be preferred over the voice contrast put forth by Moulton.

Table of Runic Norse consonants

	phonemes	allophonic distribution
fortis	/p/	p?
	/t/	t-, -t-, -t
	/k/	k-, -k-, -k
lenis	/b/	b-, -ƀ-
	/d/	đ-, -đ-
	/g/	g-, -ǥ-, -x
	/f/	f-, -f-, -f
	/þ/	þ-, -þ-, -þ
	/h/	h-, -h-, -h

C. Phonemic Analysis of Old Icelandic

The classical period of Old Icelandic, an offshoot of Old Norwegian, extends from about the twelfth to the fourteenth century. After that the language underwent a transition which led to Modern Icelandic. Most of the Old Icelandic material is written in the Latin script, primarily in the form of the Carolingian minuscule. It had been adopted together with the use of velum in the course of Iceland's conversion to Christianity. The great wealth of Old Icelandic documentary evidence contains an extensive corpus of literary works in prose and poetry along with homilies and legal documents. Furthermore the orthography is

relatively stable and provides means to express fine distinctions, which makes it an excellent tool for our purposes.

Analysis of Labials

In the labial order we find a three-way contrast between the voiceless stop /p/, the voiced stop /b/ and the spirant /f/.

/p/ It occurs in all positions and corresponds to Gmc. /p/: *þungr, grîpa, hialpa, verpa, hialp, greip.*

/pp/ Geminated /pp/ sometimes goes back to Gmc. /pp/ as in *klappa, hoppa* (Noreen 1970: §324); more often it is the result of assimilation of a nasal followed by a labial stop -[mp] > [pp]: *kapp* 'contest', *suoppr* 'mushroom'.'

/b/ Historically it has two allophones: a stop [b] initially, in gemination, and following a nasal: *borg, krabbe, lambe;* intervocalically and finally a spirant [ƀ]: *gefa, gaf, ulfr.* It reflects Gmc. /b/ and Gmc. /f/ in voiced environment.

/f/ If we assume /f/ to be a voiceless spirant < Gmc. /f/, it occurs only in initial position: *faþer, fótr,* and when followed by voiceless consonant: *gift.*

Moulton, however, interprets /f/ as having voiced and voiceless allophones: [f] *faþer, gift,* and [ƀ] *gefa, gaf.* The status of [ƀ] is ambiguous, since it could belong to either /b/ or /f/. In analogy with the dentals, where we

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' More about this in the part on assimilation.

shall find contrast between [ð] and [d], and where it is therefore justified to assign the voiced spirant [ð] as an allophone to the spirantal phoneme /þ/, Moulton considers labial [ƀ] to be an allophone of /f/. He sees this supported by the Old Icelandic orthography. His allophonic distribution, which we accept, is thus as follows:

/b/ [b] initially, after nasal, and in gemination,

/f/ [f] voiceless initially, and when preceding a voiceless consonant, [ƀ] voiced elsewhere.

Analysis of Dentals

In the dental order we also find a three-way contrast: /t d þ/.

/t/ The voiceless dental stop occurs in all positions: *tunga, heita, hiarta, salt, set.*

/tt/ The voiceless geminated stop occurs in medial and final position, and is in the majority of cases the result of assimilation of Gmc. *-[nd]$_a$ >*-[nt] > *-tt: bitt, batt,* (imperative and preterit of *binda*), *vatt* (infinitive *vinda*), *skattr*. This is of particular interest, since it implies a Germanic lenis becoming fortis in Old Icelandic.'[10]

/d/ The voiced dental stop occurs only in initial position, after nasal and in gemination: *dagr, lande, kodde*. The voiced spirant [ð] which was an allophone of /d/ in

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[10] More about this in the part on assimilation pp. 141-147.

Runic Norse, is a voiced allophone of the spirant /þ/ in Old Icelandic. The reason for this is change due to vowel syncope. The change *[hírđiđǫ:] > *[hírddǫ:] > *[hírdǫ:], OI *hirda* (Moulton 1954: 19) produced a new cluster [rd] in contrast with the already existing [rđ], OI *verþa*. Equally the change *[wániđǫ: táliđǫ:] > *[wándǫ: táldǫ:], OI *vanþa, talþa* resulted in new clusters [nđ lđ] in contrast with the already existing [nd ld]. In these environments [đ] is in contrast with [d], and therefore [đ] is no longer an allophone of /d/ but of /þ/.''

/þ/ The dental spirant has voiced and voiceless allophones. It is voiceless initially and when preceding s: *þǫkk, môþs*. It is voiced elsewhere: *vanþa, talþa, bióþa, bauþ*.

Moulton reverses his primary and secondary distinctive features in the passage from Runic Norse to Old Icelandic. In Runic Norse voice is the primary distinctive feature, i.e., (t : þ) : d; for Old Icelandic it is occlusion, i.e., (t : d) : þ. In Runic Norse Moulton made occlusion the secondary distinctive feature, i.e., t : þ, but for Old Icelandic he made it voice, i.e., t : d. The same holds true for the labials, where we had (p : f) : b for Runic Norse, but (p : b) : f for Old Icelandic. Fortis-lenis as primary distinctive feature, however, allows us to apply the same structural feature to both periods. Compare the two sets of

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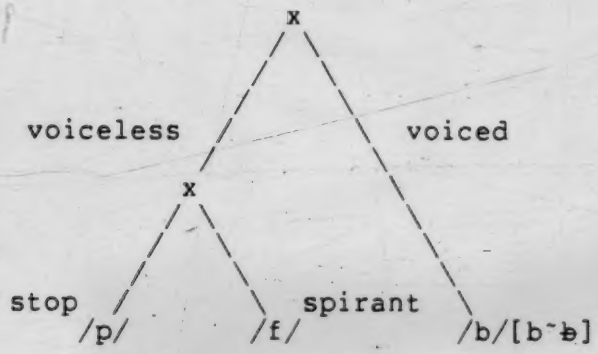
'' For a more detailed treatment of these structural changes see Moulton (1954: 19-20).

tree-diagrams:

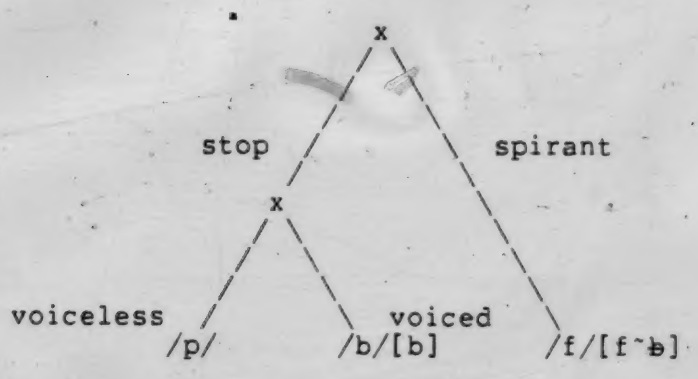
Moulton's analysis for Runic Norse

Labial order



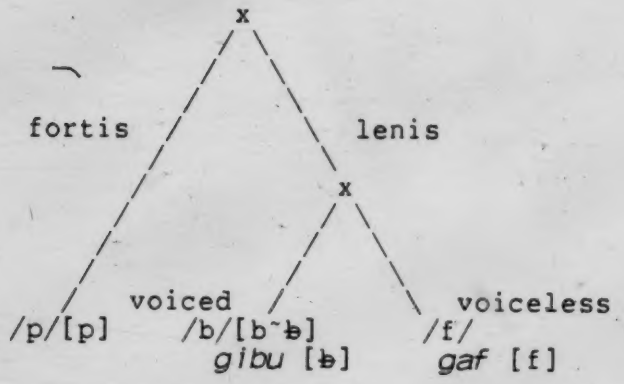
Moulton's analysis for Old Icelandic

Labial order



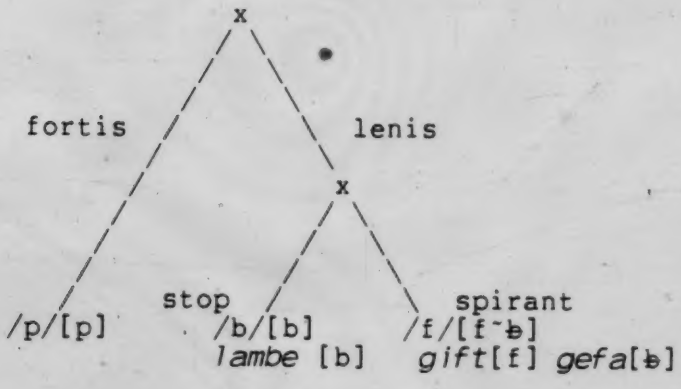
Fortis-lenis for Runic Norse

Labial order



Fortis-lenis for Old Icelandic

Labial order



Moulton's diagrams indicate a system in which voice is the primary distinctive feature for Runic Norse and (as we shall see below) Old Icelandic velars, while occlusion serves as primary distinctive feature for Old Icelandic labials and dentals. Surely then, an analysis which employs only one primary distinctive feature (fortis-lenis) for all these is to be preferred.

Analysis of the Velar and Glottal Order

As in Runic Norse we find two contrasting phonemes for Old Icelandic, /k/ and /g/.

/k/ The voiceless stop occurs in all positions: *korn, folkom, verk, auka, ok, spakt.*

/kk/ It occurs geminated in medial and final position and is frequently the result of assimilation: Gmc. *-[ng] > *-[nk] > OI *-kk: drekka, bekkr, stakk, gekk, hekk.*[13]

/g/ For /g/ we find three allophones: 1. A voiced stop [g] initially, in gemination and after nasal: *gestr, vagga, langa, lang;* 2. a voiced spirant [ɣ] elsewhere: *suelga, barg, draga, dag,* with the exception that it is a voiceless spirant [x] before *s* or *t*: *heilags, heilagt.* Except for the voiceless spirantal allophone of /g/ the velar order is the same as in Runic Norse.

/h/ The occurrence of the glottal spirant is restricted to initial position: *horn, hane, hefia.*

We consider /k/ to be fortis as it is a voiceless stop, /g/ is seen as lenis since it has spirantal allophones and is mainly voiced. /h/ is to be considered lenis due to its spirantal nature. It does not have a fortis counterpart.

In Moulton's analysis voice is the primary distinctive feature for the velars, unchanged from Runic Norse. This is, however, less than ideal, since OI /g/ has besides its voiced allophones [g] and [ɣ] also a voiceless allophone

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[13] More about this in the part on assimilation pp. 141-147.

[x].[13] This could be avoided by employing fortis-lenis, which also was found to be preferred as primary distinctive feature for the labials and dentals.

D. Assimilation in Old Norse

Even though fortis-lenis as primary distinctive feature is maintained from Germanic into Runic Norse, and further into Old Icelandic, many changes took place during the period which we consider as Old Norse.

For obvious reasons we are particularly interested in those changes which imply a shift between lenis and fortis. Therefore we need not concern ourselves with the many changes which occurred within the lenis or the fortis side. There is almost no change that implies a shift from fortis to lenis.[14] Our main concern will therefore be directed solely at the changes from lenis to fortis.

The changes are assimilatory in nature, i.e., the sounds became adapted to their specific environment. We are looking either at clusters of lenis sounds, or clusters of lenis with fortis sounds. We shall now examine those two groups of clusters in order to establish a pattern according to which the shift from lenis to fortis took place.

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[13] Moulton admits this shortcoming (1972 :152).
[14] Note as an exception: *t* or *k* > *d* Noreen 1970: §248), which, however, often > *t* (Noreen 1970: §238.2).

1. Clusters containing lenis and fortis members.

*gód + t (neut.sg.adj.) > *gott* 'gut' (Noreen §268.2). The process involved here is twofold: (1) Devoicing of the lenis member [đ] to [þ], and (2) a change from the voiceless spirant to the voiceless stop. The latter step is the shift from lenis to fortis. Alternatively one could imagine an intermediate stage [dt], highly unstable, upon which devoicing causes the shift to fortis [tt].

*fôđiđat > *fǿdd + t (neut.sg.p.part.) > *fǿtt* 'geboren' (Noreen 1970: §268.1). Here, as in the second alternative above, devoicing of [d] implies also the shift of lenis to fortis.

*matiđo (past t. weak v.) > *matta* 'schlürfte' (Noreen §276). Through vowel syncope *t* and *đ* form a cluster. The ensuing progressive assimilation consists (1) in devoicing the lenis member, (2) in the voiceless spirant becoming a voiceless stop. This second step implies the shift from lenis to fortis. Alternatively, one could imagine an intermediate stage *[td], highly unstable, upon which again devoicing causes the shift to fortis [tt].

*campus (loan word from Latin) > *kapp*. Here again the process is twofold: (1) Devoicing of the nasal, which is a lenis sound, and (2) assimilation by the following fortis stop. Alternatively: *[mp] > *[bp], upon which

again devoicing causes the shift to fortis [pp].

**band* (past sg. strong v.) > **bant* > *batt*.

**geng* (as above) > **genk* > *gekk*. The devoicing of *[nd] > *[nt] and *[ng] > *[nk] resulted at first in suspending the fortis-lenis contrast in final position. Later loss of final vowel reinstated the contrast of fortis-lenis in final position: **gáng* > *gakk* 'go' vs. **gánga* > *gang* 'course'. Devoicing of the nasal then led to the assimilation to the fortis sound. This also took place in medial position: **drenka* > *drekka* 'to drink'. Alternative developments can again be imagined: *[nt] > *[dt] > [tt], and *[ŋk] > *[gk] > [kk], in which devoicing is the trigger for the shift to double fortis. **gánga* had no assimilation, because the nasal did not become devoiced.

It appears then, that in all of the above examples the change involves devoicing as a preliminary step. The fortis pronunciation of one member is likely to have induced fortis pronunciation in the other. The assimilatory process begins with devoicing and is in the direction of fortis, i.e., is caused by the extra energy applied to one of the consonants.

2. Clusters containing only lenis members.

* *moþþe* > *motte* 'Motte' (Noreen 1970: §241). A geminate voiceless lenis spirant becomes fortis. (Cf. OHG *motte* < WGmc. /þþ/.)

wahsan > *vaxa* 'wachsen' (Noreen 1970: §222.2).

refsan > *repsa* 'züchtigen' (Noreen 1970: §240.2). One of two voiceless lenis spirants becomes fortis.

werþan > *verþa* [verda] 'werden' (Noreen 1970: §221.1).

finþan > *finna* 'finden' (Noreen 1970: §275). One voiceless member in voiced environment becomes voiced, therefore no change to fortis.

afbindi [bb] > *abbinde* 'Stuhlzwang' (Noreen 1970: §269).

audiðō > *eydda* (past sg. of *eyþa* 'veröden' (Noreen 1970: §238.1).

hirdda > *hirþa* [d] 'bewachen' (Noreen 1970: §238). Voiced environment prevents a shift of voiced lenis stops or spirants to fortis.

It appears then, that the presence or absence of voice is decisive for a shift from lenis to fortis in cases where two lenis sound are involved.

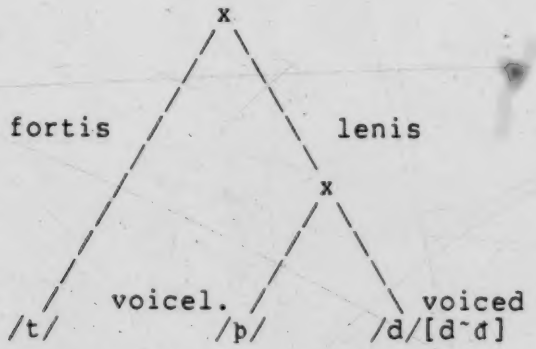
From the examples in 1 and 2 above it follows that:

a. Two voiced lenes in a cluster do not shift to fortis.
b. One voiced and one voiceless lenis member in voiced environment do not shift to fortis.
c. Two voiceless lenes shift to fortis.
d. In clusters with one fortis and one lenis member, devoicing prepares the way for the shift to fortis.

Tree diagrams can be used to demonstrate that the assimilatory process in clusters involving at least one

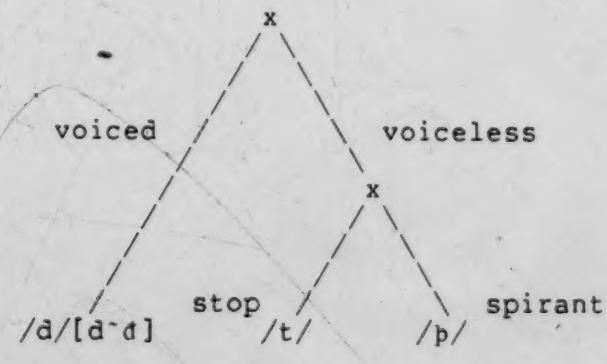
fortis and one lenis member is better explained with fortis-lenis as primary contrast.

Runic Norse Fortis-lenis



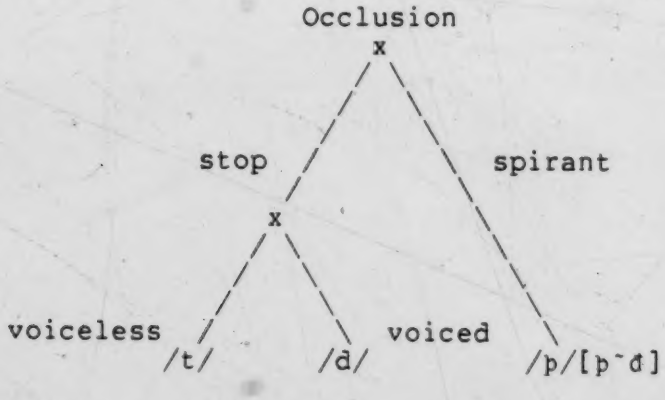
.he first step, the devoicing, happens on the lower level of the tree, eliminating the secondary contrast in this particular environment. The second step happens on the higher level and eliminates the primary, fortis-lenis contrast, which is represented by the main node on the tree.

Runic Norse Voice-contrast



On the tree based on primary contrast of voice, however, the first step (*ð* > *d*), i.e. **góð + t* > **gódt*, is allophonic, logically preceding the phonemic stage (*d* > *t*), i.e. **gódt* > *gott*, but it is still true that the main contrast is neutralized, while the less important contrast

(lower node) is unaffected. It is more plausible to allow the less important phonemic contrast to be affected first. Moulton has chosen a primary distinction of occlusion for Old Icelandic labials and dentals. Seen on the tree below it works in the same way as the last example:



The first step takes place on the allophonic level, **góđ + t > *góþt*, but the next involves the primary contrast and bypasses the lower contrast, **góþt > gott*. A further critique could be made here as has been made above.[15] Moulton has sacrified a uniform analysis for all dialects.

Summing up the reasons why fortis-lenis is to be preferred over an analysis based on voice distinction, we stress the following points:

(a) Both Runic Norse and Old Icelandic can be dealt with by applying the same continuing fortis-lenis.

(b) Within Old Icelandic all three orders can be analysed with fortis-lenis.

(c) Fortis-lenis functions only as a phonemic distinction, never as an allophonic distinction. It is therefore

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[15] See part B. 'Dentals' of this chapter.

better suited as primary distinctive feature than voice which is also allophonic.

(d) Fortis-lenis contrast supplies a more consistent and logical explanation for the assimilatory process.

E. Conclusion

The analysis of Runic Norse has shown that the structure has not changed a great deal from what we have posited to be the Germanic consonant structure. In fact the only change occurred at the allophonic level, i.e. the allophonic distribution of /b d g/. Not surprisingly therefore we found that the fortis-lenis distinctive feature was applicable also to Runic Norse.

Even the changes from Runic Norse to Old Icelandic do not alter the basic structure of the consonants, provided that fortis-lenis contrast is taken as primary distinctive feature. Although the basic structure remains intact, some changes did take place regarding individual consonants in certain positions. In particular we directed our attention to former lenis sounds that became fortis. These changes are explained by the position in which they occur, namely final position in which we observe devoicing, which, as we have seen, can be part of a process that leads from lenis to fortis. It is therefore not surprising to find

neutralization of the fortis-lenis contrast in final position. This position of neutralization was conducive to changes leading either to fortis or lenis.'‘ Changes from lenis to fortis which occurred in medial position were caused by voiceless environment which effected loss of voice and subsequent assimilation to a fortis sound.

In all areas examined we found a primary contrast fortis-lenis to offer a simpler, more consistent, or more logical explanation of the sound changes involved.

'‘ Cf. Steblin-Kamenskij (1974: 6)"...but also the position of neutralization is important, since in Scandinavian as in other Germanic languages it is exactly in this position that the most appreciable changes occur."
See also Chapter III. part D. footnote 21.

V. OLD ENGLISH

A. Introduction

The examination of Old English extends our study of the West Germanic language group, which is already represented by the Old High German dialects. It differs, however, in that Old English, of course, lacks the effects of the Second Sound Shift and exhibits different consonantal changes, particularly in the palato-velar order.

We are aware of the considerable dialectal differences between the Anglian dialects in the North including Northumbrian and Mercian, and the basically Saxon dialects in the South represented by West Saxon and Kentish. The richest tradition of literary documents from the Old English period (from about the sixth to the end of the eleventh century) has come down in the West Saxon dialect of King Alfred's reign. This determines to a large extent the material on which to base an examination of Old English consonants. Where it appears suitable, examples of Anglian provenance will also be included.

B. Phonemic Analysis of Old English

Labials

Labial Stops

For the labial stops we find the following spellings: *p*

pp b bb.[1]

/p/ The voiceless stop *p* occurs in all positions: *pâd* 'Hemd', *plega* 'Spiel', *helpan* 'help', *weorpan* 'throw', *scearp* 'sharp', *up(p)* 'up', *æppel* 'apple'. It reflects Gmc. /p/

/b/ The voiced stop occurs as *b* initially, after nasal, and in gemination: *burg* 'castle', *bindan* 'bind', *lambes*, *lamb* gen. and nom.sg. of 'lamb', *habban* 'have', *sib(b)* 'Sippe', *libban* 'live'.

Labial Spirant

The labial spirant occurs as *f*.

/f/ In initial position it is assumed voiceless and reflects Gmc. /f/: *findan* 'find', *fæder* 'father'. In medial position it is voiced, and reflects Gmc. /b/[ƀ] *gefan* 'give', *earfoð* 'Arbeit', as well as Gmc. /f/ *wulfes* gen.sg. 'wolf', *hofer* 'Buckel'. In final position it is assumed voiceless and again reflects both Gmc. /b/ as in *wîf* 'Weib' and Gmc. /f/ as in *wulf*.[2] It is also voiceless when followed by a voiceless consonant *hæft* 'gefangen', *ræfsan* 'tadeln', and in gemination *pyffan* 'puffen', *woffian* 'rasen'.

We consider /p/ to be fortis unchanged from Germanic. It contrasts with /b/ which is assumed to be lenis because it is voiced. The contrast of voiceless /p/ with voiced /b/ we assume to be a reflection of the more fundamental

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[1] The examples listed in this chapter are from K. Brunner 1965 and W.G. Moulton 1954, unless quoted otherwise.
[2] For more details see Sievers 1886 and Penzl 1944.

fortis-lenis contrast. /f/ is considered lenis, since it has coalesced with the spirantal allophones of Gmc. /b/. It is voiced or voiceless according to environment, a characteristic which we associate with lenis quality. /ff/ contrasts in Old English with intervocalic /f/, which is [ƀ]. The contrast then exists between a long voiceless sound and a short voiced sound. We would therefore expect that OE /ff/ is already fortis. The evidence from later developments supports this: OE *puffan* has developed to MnE *puff* with fortis voiceless /f/, whereas medial /f/[ƀ] has become voiced lenis as in OE *lufian* [ƀ] > MnE *love*. This can also be seen when comparing past tense forms where the dental past tense formant indicates whether the preceding spirant is voiced = lenis or voiceless = fortis: *pyffan* /ff/[ff], past tense *pyfte* [ft], vs. *getwæfan* /f/[ƀ], past tense *getwæfde* [vd].[3] /bb/ is considered lenis as we have established for Pre-Old High German and Old Saxon.[4] Voicing prevents its becoming fortis in spite of its length.

The primary Germanic distinctive feature, which was voice according to Moulton (1954), changed in his analysis to one of occlusion in Old English, since medial voicing of spirants eliminated the contrast between /b/[ƀ] and /f/[f] in this position. Consequently [ƀ] became an allophone of /f/, which resulted in the structure (p : b) : f, where the stops were in primary contrast with the spirant. Voice

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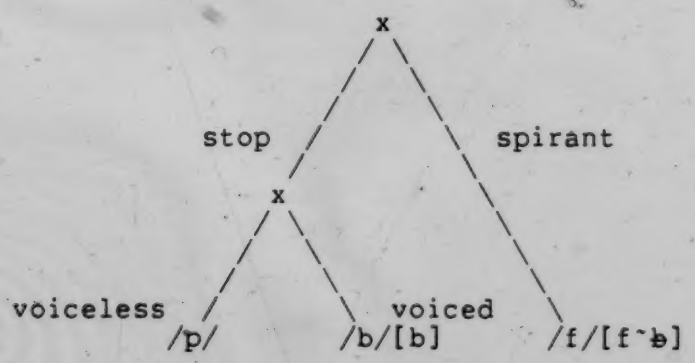
[3] See Penzl 1944: 86.
[4] Cf. Chapter III. pp. 56-60.

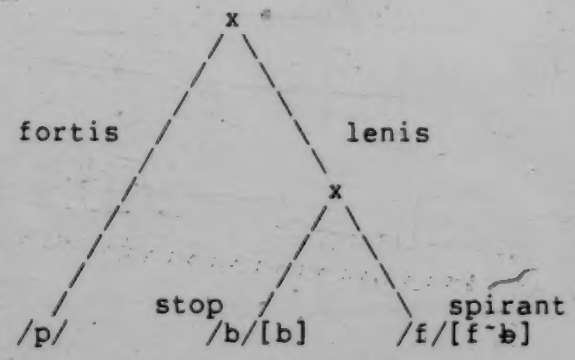
became the secondary contrast for p : b; it also appeared as allophonic distinction for /f/, which occurred voiceless in initial and final position, and voiced in medial position.

Labial consonants



We object to this structure on the same grounds as in previous chapters.[5] Moulton assumed a structure based on voice distinction for Pre-Old English, which then gave way to a structure based on a primary distinctive feature of occlusion. The use of fortis-lenis as primary distinctive feature, as below, is to be preferred because it supplies a uniform structure for both Pre-Old English and Old English.

Labial consonants



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[5] Cf. Chapter II. and IV. on Gothic and Old Norse respectively.

There are two further advantages to this analysis: The first is that the reallocation of [ƀ] from /b/ to /f/ does not cause drastic change in the subsystem, since it is restricted to the secondary level, whereas in the structure based primarily on voice contrast the same reallocation involves the primary contrast. We may claim a second advantage by arguing that Moulton's analysis based on occlusion entails an inconsistency in that the secondary contrast of voice is phonemic with the stops yet allophonic with the spirant. By using fortis-lenis as primary contrast, we restrict voiced-voiceless to the allophonic level.[4]

Dentals

Dental Stops

For the dental stops we find the following spellings: *t tt d dd.*

/t/ It occurs as *t* in all positions: *tôð* 'tooth', *trêo* 'tree', *winter* 'winter', *etan* 'eat', *heorte* 'heart', *wât* 'weiss', *settan* 'set'. It reflects Gmc. /t/.

/d/ The voiced stop occurs as *d* in all positions: *dæg* 'Tag', *drîfan* 'treiben', *landes* gen.sg. of 'land', *wordes* gen.sg. of 'word', *bêodan* 'warten', *ald* 'old', *gold* 'gold', *bêad* imp.sg. of *bêodan*. It also occurs in gemination: *biddan* 'bitten', *næddre* 'Natter'. It reflects Gmc. /d/, which in Old English, as in West

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[4] Cf. also Chapter II. p. 139 and Chapter IV. 'Assimilation in Old Norse' p. 146.

Germanic generally, had lost its spirantal allophones and become a stop in all positions.

Dental Spirant

/þ/ The dental spirant occurs indiscriminately as *ð* and *þ*.[7] It reflects Gmc. /þ/ and occurs in all positions. It was assumed to be originally voiceless, later becoming voiced in voiced environment[8] if preceded by stressed vowel. Although it is not directly expressed in the orthography, we posit voiceless allophones initially and finally, parallel to the labials: *ðing* 'thing', *ðrî(e)* 'three', *þanc* 'thank', *cwæþ* sg.past tense of *cweðan* 'to speak'. It remained voiceless also where /þ/ followed unstressed vowel lost through syncope: *mônþe* < *[mó:naþæ], *hælþe* < *[há:liþæ] 'month, health'. It occurs voiced medially in voiced environment following stressed vowel: *weorþan* 'become', *cweþan* 'speak'. It also occurs geminated: *oðde* 'or', *sceððan* 'schädigen', *siopþan, seopþan* 'seitdem', *moðde* 'moth'.

/t/ is considered fortis unchanged from Germanic, since it is voiceless. It is in contrast with voiced /d/, which therefore is assumed to be lenis. Again, as with the labials, the contrast of voiceless /t/ and voiced /d/ reflects the more fundamental contrast of fortis-lenis. We

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[7] The oldest sources use mainly *th* for the spirant. *ð* begins to occur in the early eighth century, *þ* from the Runic alphabet appears about a century later. When quoting examples we follow the practice of our main source, Moulton 1965. For details see Brunner 1965: §199.

[8] Cf. the labial spirant /f/.

consider /þ/ to be lenis, guided by its characteristic of having voiced allophones. /þþ/ contrasts with intervocalic /þ/. The contrast, then, consists of long voiceless sound vs. short voiced sound, parallel to the labials, /ff/ : /f/.' We would therefore expect that /þþ/ is already fortis in Old English. The modern reflex of OE /þþ/ is fortis /þ/ as in *moth*. /dd/ is lenis, since its Modern English reflex is lenis: *bid*, *adder* [d]. Voicing prevents this geminate from becoming fortis.

As with the labials, Moulton's structure of the dentals is based on a primary distinctive feature of occlusion, a change from the primary contrast of voice in Pre-Old English. The same argumentation in favour of a fortis-lenis primary contrast therefore holds true for the dentals.

(a) Fortis-lenis supplies a uniform structure for both Pre-Old English and Old English.

(b) In the principal parts of several strong verb classes /þ/ and /d/ alternate under conditions of Verner's Law (Grammatical Change): *lîþan, lâþ, lidon, liden* 'go'; *cweþan, cwæþ, (...), cweden* 'speak'; *weorþan, wearþ, wurden, worden* 'werden'.'° This type of morphophonemic alternation should be viewed as involving the secondary distinction as is the case when fortis-lenis is primary, rather than involving the primary distinction as is the

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' Cf. Luick (1965: §639) and Ekwall (1965: §139). Voicing in modern *scathe* and its initial [sk-] indicate origin in ON *skaða*, not OE *sceddan*. Cf. *Oxford Dict. of Eng. Etym.*, ed. C.T. Onions (Oxford, O.U.P.), 1966, under *scathe*.

'° Examples are from Prokosch 1939: 65.

case with a primary contrast of occlusion.''

(c) With occlusion as the primary contrast, voice serves inconsistently both as a phonemic and as an allophonic contrast. This is not the case when fortis-lenis is the primary contrast.

Apico-Alveolar Spirants

As in all the Germanic languages except Gothic, Proto-Gmc. /z/ merged with original /r/ in Old English as the result of rhotacism: *mâra* 'grösser', *êare* 'ear', with old /z/ - *rîce* 'Reich', *wer* 'Mann', with old /r/.

/s/ It occurs as s in all positions: *sunu* 'son', *sprecan* 'sprechen', *cêosan* 'choose', *wesan* 'sein', *mûs* 'mouse'. It is assumed to have voiced allophones in voiced environment and to be voiceless elsewhere.

/ss/ It occurs geminated intervocalically and is voiceless: *cyssan* 'to kiss', *assa* 'ass'.

/s/ is considered lenis, due to its voiced and voiceless allophones. /ss/ is considered fortis, because it is voiceless and of longer duration. /ss/ and /s/ are in contrast only in intervocalic position. The modern reflexes confirm this contrast: *kissing, passing* /s/ vs. *rising, noses* /z/.

'' Cf. tree diagrams in the section dealing with the OE labials.

Palatals and Velars

Palatalization'[2] of Germanic velar consonants in the neighbourhood of palatal vowels in Pre-Old English resulted in palatal and velar allophones for Gmc. /k/ and /g/. Subsequent partial loss of the original cause for palatalization (the part lost being postconsonantal /j/, final /i/, vowel rounding in /ö/ and /ö:/) brought the former allophones into contrast.'[3] The result was phonemicization of the palatal and velar former allophones in Old English. Although their phonetic quality is uncertain, pertinent characteristics such as voice, occlusion and duration can be assessed.

Velar Stops

For the stops we find the following spellings: *c cc x k g gg cg*.

/c/ The voiceless velar stop occurs as *c* in all positions: *cosp* 'Fessel', *cûð* 'bekannt', *sacan* 'streiten', *æcer* 'Acker', *hôc* 'Hacken'. It also occurs occasionally as *k* mainly in initial position, most frequently before *y*: *kyning, kyn* 'king, kin'. /c/ + /s/ occurs often as *x*: *rîxan* 'herrschen'.

/c'/ The voiceless palatal stop occurs in all positions as *c*: *ceald* (WS,Kent.) 'cold', *ceosan* 'choose', *cild* 'child', *ci(e)st* (WS) 'chest', *cirice* 'church',

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'[2] For a more detailed treatment of the change of the Germanic velars in Old English see handbooks, e.g. Brunner 1965: §§205-216; Luick 1964: §§637, 685-689; also Moulton 1954: 24-27; Penzl 1947.

'[3] Moulton 1954: 24.

drenc(e)an 'drench', *benc* 'bench'.

We consider both /c/ and /c'/ to be fortis, since they are voiceless, as is still evident from their modern reflexes: *king* [k], *child* [tš].

Gmc. /g/ had stop and spirant allophones. Each of these split again into palatal and velar variants in Pre-Old English, which became phonemes in Old English under similar conditions to OE /c/ and /c'/.

/g/ The voiced velar stop occurs initially, in gemination and after nasal: *gôs* 'goose', *dogga* 'dog', *springan* 'springen', *sprang*, past tense sg. of *springan*.

/g'/ The voiced palatal stop occurs in gemination and after nasal: *licg(e)an* 'to lie', *wecg* 'wedge', *feng* 'grasp'.

/x/ The velar spirant occurs voiced medially after vowel, *r* or *l*: *dâgas* 'dough', *beorgan* 'bergen', *swelgan* 'verschlingen', *stîgan* 'steigen'. It is voiceless in final position: *dâg*, *bearg*, *swealg*, *sealh* 'seal', *mearh* 'Pferd'; and also voiceless when followed by voiceless consonant: *stîhst* 'du steigst', *meaht* 'might'. OE /x/ reflects Gmc. /g/[ɣ] and Gmc. /x/[x].

/xx/ Gmc. /x/ occurs geminated intervocalically as in *cohhettan* 'cough', *hliehhan* (WS) 'laugh'. It contrasts only medially with the voiced allophone of OE /x/ *dâgas*. The combination of voicelessness and duration indicates fortis.

The palatal spirant from Gmc. /g/ merged with old /j/: OE *wæg* /wæ:j/ 'wave', *gêafon* /jæ:fon/ 'gave', have the same

phoneme as *gêar* /jæ:r/ 'year' with Gmc. /j/. The merging allophone therefore is no longer part of the structure of stops and spirants.

/h/ It occurs only initially and appears to be a glottal spirant: *horn* 'horn', *helpan* 'help'. Where it occurred medially in voiced environment, it was lost through the voicing of medial voiceless spirants still prior to the documented Old English period: OE genitives *sêales*, *mêares*, *scôs* 'willow, horse, shoe' < */séalhes, méarhes, scó:hes/, as compared with the corresponding nominatives *sealh*, *mearh*, *scôh* with voiceless velar spirant, allophone of /x/.'[14]

Guided by the presence of voice we consider both /g/ and /g'/ to be lenis. /x/ is assumed lenis, because it has voiced and voiceless allophones. /xx/ is voiceless and also of longer duration, which implies fortis quality.

The Old English contrast of fortis /xx/ and lenis /x/ is not maintained into Modern English. When OE /xx/ in *cohhettan*, **cohhian*,'[15] came into final position because of loss of final unstressed syllable, probably only towards the end of the Middle English period, it became shortened, but remained voiceless and fortis. OE /x/ in final position in *trog,-h*, *dag* 'trough, dough', was short like a lenis, but had become voiceless like a fortis. This development in final position therefore caused a shift of the lenis

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'[14] See Moulton 1954: 26.
'[15] See Jordan 1974: §124.

consonants towards the fortis category,'‘ making further development to fortis a possibility. Vowel development and other changes in the language, which are beyond the scope of this study, triggered such continued development sometimes to fortis, sometimes back to typical lenis.

Some examples of OE /x/ which became fortis in Modern English have merged with OE /xx/:

MnE *cough* /f/, *laugh* /f/ < OE /xx/

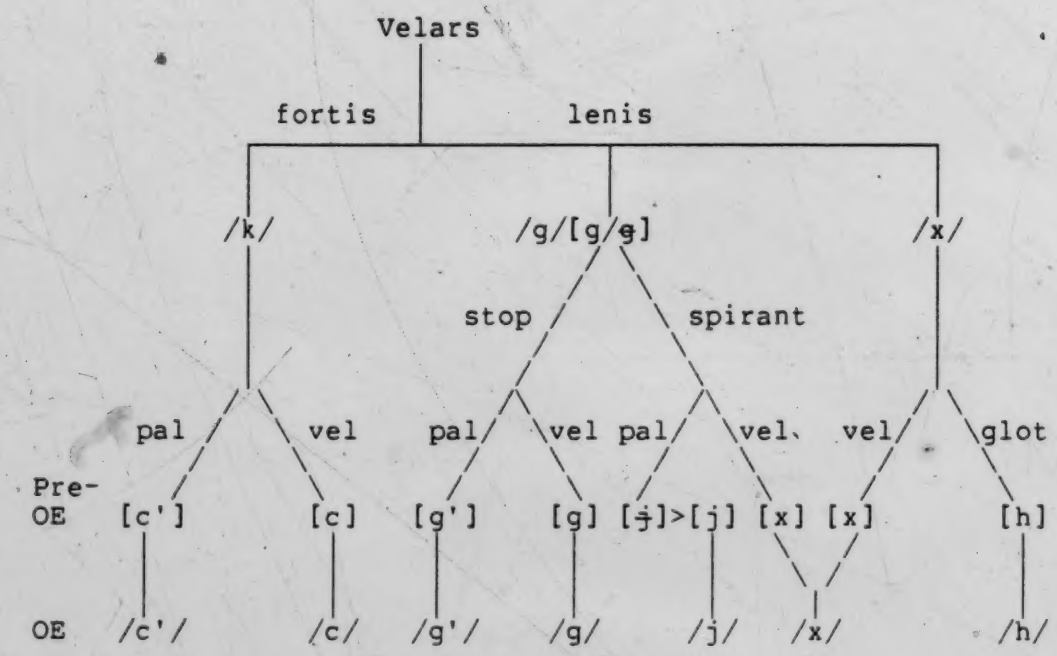
MnE *trough* /f/, *enough* /f/ < OE /x/.

Others taking the lenis development have lost the velar spirant alltogether in Modern English, presumably via a stage of voicing:

MnE *plough* /Ø/, *dough* /Ø/ < OE /x/.

The following diagram shows the fortis and lenis velar consonants in a schematized development from Germanic into Old English.

'‘ See Chapter IV. part C. 'Assimilation in Old Norse', and Chapter III. on Old High German, footnote 21.

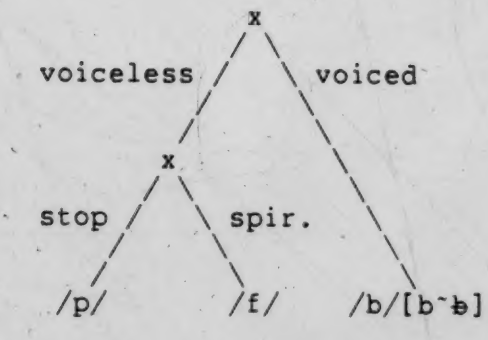


C. Conclusion

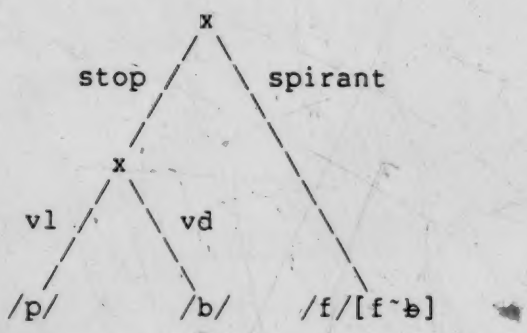
The results from the examination of the Old English consonants support the claim that fortis-lenis was operative in Germanic contrary to the traditional view, which assumes a primary contrast of voice. Support comes from the simplicity of structural changes with fortis-lenis, and from a proven continuity of fortis-lenis from Germanic into Old English, which is demonstrated on the following tree diagrams:

Pre-Old English

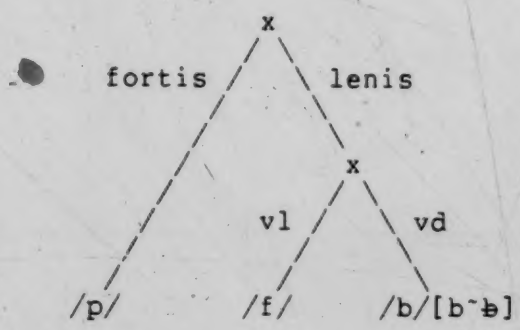
Moulton

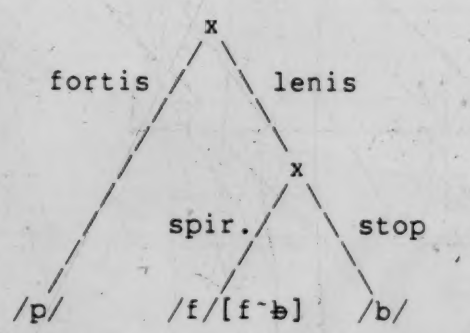


Old English



Fortis-lenis





1. On the tree diagrams above Moulton's Pre-Old English structure shows the contrast stop vs. spirant being both phonemic and allophonic. The fortis-lenis analysis is more consistent by employing the contrast stop vs. spirant only on the allophonic level.
2. The same observation is made for Moulton's Old English structure where the contrast voiced vs. voiceless is both allophonic and phonemic, whereas with fortis-lenis voiced vs. voiceless is only allophonic.
3. Moulton's entire structure changes from Pre-Old English

to Old English. Primary and secondary contrasts are reversed, when the primary contrast of voice in Pre-Old English is replaced by a primary contrast of occlusion in Old English. In the fortis-lenis analysis the structure is modified only by changing the secondary contrast from voiceless vs. voiced to spirant vs. stop, leaving the primary contrast of fortis-lenis unchanged.

Further observations made below confirm the significance of the acoustic properties voice and duration with regard to changes within the fortis-lenis structure, as has been found in previous chapters.''

1. Voiced lenis spirants in final position became voiceless lenis spirants. The latter status is phonetically closer to fortis. Modern English has fortis phonemes for these old lenes, e.g. MnE *wife* /f/ < OE *wīf* /f/[f] < Pre-OE */wi:b/ [b̥]. Devoicing was therefore the first stage to transfer to fortis.
2. We noted that voiced geminates stay lenis: OE /bb dd gg/ > MnE lenis /b͡v d g͡j/, e.g. OE *biddan* > MnE *bid* /d/, OE *habban* > MnE *have* /v/, OE *sibb* > MnE *sibling* /b/. Voicing therefore prevents fortification in spite of increased duration.
3. The combination of voicelessness and increased duration was found to create conditions for transfer to the

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'' See chapters on Old High German and Old Norse.

fortis category. This was probably already the case in Old English. The voiceless Germanic lenis geminate spirants /ff þþ ss xx/ upon simplification became modern English fortis /f þ s/, e.g. OE *puffan* /ff/ > MnE *puff* /f/, OE *moþþe* /þþ/ > MnE *moth* /þ/, OE *assa* /ss/ > MnE *ass* /s/, OE *cohhettan* /xx/ > MnE *cough* /f/.

An examination of Old Saxon consonants yields the same results as we have found for Old English. It should be noted that in Old Saxon palatal phonemication occurred only in the voiced velar spirant [ɣ], which became [j] in palatal environment and merged with the Old Saxon reflex of Gmc. /j/. If palatalization was more widespread, it could only have been on the allophonic level. Since Moulton assumes the same structural contrasts for Pre-Old Saxon and Old Saxon as for Pre-Old English, the same conclusions apply.

The results of the examination of the Old English and Old Saxon evidence support our view that fortis-lenis as primary distinctive feature offers a simpler and more consistent description of the consonant system and the changes that occur within it.

CONCLUSION

In order to summarize the essential points of the foregoing study, let us retrace in a condensed form the steps which led to our hypothesis and which demonstrated its validity.

Acoustic phonetic findings based on examinations of Alemannic, Bavarian and English (supplemented by observations of Low German, and contrasted against French pronunciation) showed that common to all is a fortis-lenis contrast in the consonants.

This fortis-lenis contrast is manifest in various ways: buccal air pressure difference, strength of explosion, intensity of explosive noise, tension, force of articulation, duration, and voice (Chapter I. pp. 14-22). Of all these indicators, duration of sounds and the presence or absence of voice are the ones for which our writing system has traditional means of expression and can thus be traced in written sources. We therefore made duration and voice the main indicators for fortis and lenis distinction. Long duration was expressed by geminate spelling as opposed to single spelling; digraphs and trigraphs reflecting spirants and affricates also indicated long duration. For the indication of voice we relied mainly on the traditional orthographic convention of voiced or voiceless symbols. Wherever the voicing evidence based on spelling alone seemed insufficient, we called upon comparative evidence to make our point.

When dealing with the Germanic consonant shift we adopted part of the theory advanced by J. Fourquet (Chapter I. pp. 22-24). According to Fourquet the Indo-European consonant system underwent a change in correlation, by which the correlation of voice gave way to the correlation of aspiration. The following step consisted in a general lenition, which resulted in the Proto-Germanic structure of /f/ /þ/ /ƀ/. A subsequent step, namely a strengthening of articulation, was to have brought the structure to the attested stage of the Germanic dialects: /f/ /þ/ /b/.

We disagreed with the two latter steps where it seemed that lenition and strengthening were used in an arbitrary fashion to fit the evidence. We preferred to believe that the Proto-Germanic consonant system after Fourquet's assumed lenition exhibited one fortis consonant /þ/ in opposition to two lenis consonants /f/ and /ƀ/. We proposed therefore at this stage to assume a realignment of the Proto-Germanic phonemic structure toward a fortis-lenis opposition in Germanic. From this follows our claim that the Germanic consonant shift resulted in a fortis-lenis opposition.

When we examined the outcome of the High German consonant shift, we found not only that the fortis-lenis opposition continued after the High German consonant shift (Chapter III. pp. 122-124), but also that fortis-lenis was fundamental to the shift (Chapter III. pp. 56-63).

This claim was based on an argument that the duration of the fortis consonants /p pp t tt k kk/ increased, which

resulted in the emergence of new spirants and affricates /ff pf z tz x cch/. This implied that the greater duration, which was found to be characteristic of fortis, acted as the conditioning factor to the Second Sound Shift. Particularly strong evidence for the crucial role of duration in the High German consonant shift was seen in the development of the lenis Germanic geminates (*/bb dd þþ gg/ > OHG /pp tt kk/).

We have therefore sufficient evidence for a fortis-lenis contrast having been present for a period of two and a half thousand years: it originated with the Germanic consonant shift, which according to mean estimates can be placed at about the middle of the last millenium before our era; fortis-lenis was instrumental to the High German consonant shift, and it is still maintained in modern German dialects.

The fortis-lenis theory conflicts with current analyses of Germanic, which consider voice to be the primary distinctive feature of the Germanic consonant system. Moulton's analysis, which we took as representative of the traditional view, served as a standard against which fortis-lenis was tested and set off. Our arguments showed not only that a primary contrast based on fortis-lenis was a valid alternative to the traditional view, but it also offered analyses which were preferable to those based on a contrast of voice.

The findings from Gothic, Old Norse and Old English (Old Saxon) showed that the primary contrast based on

fortis-lenis offered an analysis which is simpler, more consistent and more logical than an analysis based on a primary contrast of voice.

This was evidenced,

(1) when dealing with morphophonemic alternation (Gothic, Old Norse, Old English),

(2) when avoiding the inconsistency of a voiceless allophone being found on the voiced side of the primary contrast (Gothic, Old Norse),

(3) when avoiding the simultaneous use of a distinction as phonemic and allophonic (Gothic, Old Norse, Old English).

We were able to improve the analysis for Old Norse,

(1) when both Runic Norse and Old Icelandic could be dealt with by applying fortis-lenis,

(2) when within Old Icelandic all three orders of consonants could be analysed with fortis-lenis, rather than with a contrast of occlusion for labials and dentals, and a contrast of voice for the velars,

(3) when fortis-lenis was able to provide a logical gradation of combinations for the assimilatory process.

Old English confirmed our findings,

(1) when fortis-lenis supplied a uniform structure for both Pre-Old English and Old English,

(2) when the reallocation of [ƀ] from /b/ to /f/ was restricted to the lower level on the tree diagram by applying fortis-lenis.

The examination of the Old High German dialects showed that basic to the Second Sound Shift was an increase in the duration of the Germanic fortis consonants, which according to our hypothesis, had been of greater duration in comparison with their lenis counterparts. We found that the changes were all connected with fortis quality and/or duration in that the tenues, already longer than lenes, shifted within the fortis category, and the lenis geminates (long because geminated) shifted from lenis to fortis. Voicing was found to assume basically a subsidiary function, e.g. diaphonic voice variation in the mediae /b d g/.

The contrast based on fortis-lenis consistently served as a common basis for the development of the consonant systems in the Germanic languages and also supplied a common element in the two consonant shifts. This study therefore demonstrated the validity of our hypothesis that the fortis-lenis contrast rather than voiced-voiceless must be regarded as primary in the development of consonants since Germanic.

Topics which received but scant attention are recommended for further study. Among them are: a more detailed examination of all modern Germanic languages and dialects with regard to a fortis-lenis contrast, backed by findings from acoustic phonetics specifically aimed at defining the criteria which make up fortis-lenis.

BIBLIOGRAPHY

Abrahams, Henrik. 1949. *Etudes phonétiques sur les tendances évolutives des occlusives germaniques.* Aarhus: Universitetsforlaget.

Antonsen, Elmer. 1975. *A concise grammar of older Runic inscriptions.* Tübingen: Niemeyer.

Arnason, Kristjan. 1980. *Quantity in historical phonology. Icelandic and related cases.* Cambridge University Press, Cambridge.

Bannert, R. 1976. *Mittelbairische Phonologie auf akustischer und perzeptorischer Grundlage.* Lund: CWK Gleerup, W. Fink.

Barnes, Michael. 1971. Notes on the *First grammatical treatise. Arkiv for Nordisk Filologi* 86. 38-48.

Benediktsson, Hreinn. 1961. The earliest Germanic phonology. *Lingua* 10. 237-254.

---------- 1963. The non-uniqueness of phonemic solutions: quantity and stress in Icelandic. *Phonetica* 10. 133-153.

---------- 1963. Phonemic neutralization and inaccurate rhymes. *Acta Philologica Scandinavica* 26. 1-18.

---------- 1970. Aspects of historical phonology. *The Nordic languages and modern linguistics.* ed. by H. Benediktsson, 87-142 (Vísindafelag Íslendinga , vol. 39, Reykjavik).

---------- (ed.). 1972. *First grammatical treatise.* University of Iceland Publications in Linguistics. I. Reykjavik: Institute of Nordic Linguistics.

Bennett, W.H. 1946. The cause of the West Germanic consonant lengthening. *Language* 22. 14-18.

---------- 1964. Gothic spellings and phonemes. Some current interpretations. *Taylor Starck Festschrift*, ed. by W. Betz, 19-27. London, The Hague, Paris: Mouton & Co.

Bloomfield, L. 1965. *Language history* (reprint of *Language*, chapts. 17-27), ed. by H. Hoijer. Los Angeles: Holt, Rinehart & Winston.

Bostock, J. Knight. 1976. *A handbook on Old High German literature*. 2nd ed. Oxford: Clarendon Press.

Braune, W., E.A. Ebbinghaus. 1966. *Gotische Grammatik*, 17th ed. Tübingen: Niemeyer.

----------, W. Mitzka. 1967. *Althochdeutsche Grammatik*. 12th ed. Tübingen: Niemeyer.

----------, H. Eggers. 1975. *Althochdeutsche Grammatik*. 13 th ed. Tübingen: Niemeyer.

Brinkmann, H. 1965. Sprachwandel und Sprachbewegungen in althochdeutscher Zeit. *Studien zur Geschichte der deutschen Sprache und Literatur*. Vol. I. *Sprache*, 9-236. Düsseldorf: Pädagogischer Verlag Schwann.

Bruckner, W. 1935. Zur Orthographie der althochdeutschen Isidorübersetzung und zur Frage nach der Heimat des Denkmals. *Festschrift Gustav Binz*, 69-83. Basel.

Brunner, Karl. 1965. *Altenglische Grammatik. Nach der angelsächsischen Grammatik von Eduard Sievers*. 3rd ed. Tübingen: Niemeyer.

Brunner, R. 1953. Die Stimmhaftigkeit der französischen und zürichdeutschen Lenislaute. *Zeitschrift für Phonetik und allgemeine Sprachwissenschaft* 7. 153-196; 289-319.

Campbell, A. 1959. *Old English Grammar*. Oxford: Clarendon Press. 289-319.

d'Alquen, Richard. 1973. The Germanic sound shift and Verner's Law: a synthesis. *General Linguistics* 13. 79-89.

---------- 1979. Acoustic phonetics and vowel quantity in the history of German. *Zeitschrift für Dialektologie und Linguistik* 46, 2. 187-204.

Dinneen, Francis. 1967. The nineteenth century. *An introduction to general linguistics*, 179-191. New York, Chicago, San Francisco, Toronto, London: Holt, Rinehart & Winston.

Dieth, E. and R. Brunner. 1943. Die Konsonanten und Geminaten des Schweizerdeutschen experimentell untersucht. *Sache, Ort und Wort: Festschrift für Jakob Jud.* (Romanica Helvetica 20). 737-762.

Durand, M. 1956. De la perception des consonnes occlusives, questions de sonorité. *Word* 12. 15-34.

Eggers, Hans. 1960. *Vollständiges lateinisch-althochdeutsches Wörterbuch zur althochdeutschen Isidor-Übersetzung.* Berlin: Akademie-Verlag.

Eggers, Hans. 1964. *Der althochdeutsche Isidor. Nach der Pariser Handschrift und den Monseer Fragmenten neu herausgegeben.* (Altdeutsche Textbibliothek Nr. 63). Tübingen: Niemeyer.

Ekwall, Eilert. 1922. *Historische neuenglische Laut- und Formenlehre.* Berlin: de Gruyter.

Erdmann, Oskar. 1882. *Otfrids Evangelienbuch.* 5th ed. Ludwig Wolff 1965. (Altdeutsche Textbibliothek Nr. 49). Tübingen: Niemeyer.

Feist, Sigmund. 1909. *Etymologisches Wörterbuch der gotischen Sprache.* Halle: Niemeyer.

Fischer-Jørgensen, E. 1963. Beobachtungen über den Zusammenhang zwischen Stimmhaftigkeit und intraoralem Luftdruck. *Zeitschrift für Phonetik* 16. 19-36.

Fourquet, Jean. 1948. *Les mutations consonantiques du germanique. Essai de position des problèmes.* Paris: Société d'Edition 'Les Belles Lettres'. (Publications de

la Faculté des Lettres de l'Université de Strasbourg, fasc.111.)

---------- 1954. Die Nachwirkungen der ersten und der zweiten Lautverschiebungen. *Zeitschrift für Mundartforschung* 22. 1-33; 193-198.

---------- 1960. Review of *Die zweite Lautverschiebung bei Ostgermanen und Westgermanen* by Otto Höfler. *Etudes Germaniques* 15. 180-181.

Franck, J. 1909. *Altfränkische Grammatik*. Göttingen: Vandenhoeck und Ruprecht.

Gassert, Alfred. 1929. *Stimmhaftigkeit und Länge der Verschlusslaute im Konstanzer Dialekt*. Borna-Leipzig: Universitätsverlag Robert Noske.

Gordon, E.V. 1971. *An introduction to Old Norse*. (Reprint of the 2nd edition 1957.) Oxford: Clarendon Press.

Graff, E.G. 1834. *Althochdeutscher Sprachschatz*. Vol. 3. Reprint 1963. Darmstadt: Wissenschaftliche Buchgesellschaft.

Grassmann, H. 1863. Über die Aspiraten und ihr gleichzeitiges Vorhandensein im An-und Auslaute der Wurzeln. *Zeitschrift für vergleichende Sprachforschung auf den Gebieten des Deutschen, Griechischen und Lateinischen* 12,2. 81-138.

Grimm, Jacob. 1822. *Deutsche Grammatik*. Vol. I. 2nd ed. Göttingen.

Hammerich, L.L. 1955. Die germanische und die hochdeutsche Lautverschiebung. *Beiträge zur Geschichte der deutschen Sprache und Literatur* 77. 1-29; 165-203.

Haugen, Einar. 1941. On the consonant pattern of modern Icelandic. *Acta Linguistica* 2. 98-107.

---------- 1958. The phonemics of modern Icelandic. *Language* 34. 55-88.

---------- 1972. *First grammatical treatise: the earliest Germanic phonology*. An edition, translation and commentary. 2nd ed. London: Longman.

---------- 1976. *The Scandinavian languages*. An introduction to their history. London: Faber & Faber.

Hench, G.A. 1890. *The Monsee Fragments. Newly collated text with notes and grammatical treatise*. Strassburg: Trübner.

Hentrich, K. 1925. Über den Einfluss der Dauer auf die Stimmhaftigkeit von Verschlusslauten. *Vox* 5. 21-24.

Heusler, Andreas. 1962. *Altisländisches Elementarbuch*. 5th ed. Heidelberg: Carl Winter.

Hirt, Hermann. 1927. *Indogermanische Grammatik, I. Konsonantismus*. Heidelberg: Carl Winter.

Hockett, C.W. 1959. The stressed syllabics of Old English. *Language* 35. 575-597.

Höfler, Otto. 1957. *Die hochdeutsche Lautverschiebung und ihre Gegenstücke bei Goten, Vandalen, Langobarden und Burgundern*. Sonderabdruck aus: *Anzeiger der phil.-hist. Klasse der Österreichischen Akademie der Wissenschaften* 24 (1956).

---------- 1958. *Die zweite Lautverschiebung bei Ostgermanen und Westgermanen*. Sonderabdruck aus *Beiträge zur Geschichte der deutschen Sprache und Literatur* 79. Tübingen: Niemeyer.

Jakobson, R., C.G. Fant, M. Halle. 1969. *Preliminaries to speech analysis. The distinctive features and their correlates*. Cambridge Mass.: The MIT Press.

Johannesson, Alexander. 1923. *Grammatik der urnordischen Runeninschriften*. Heidelberg: Carl Winter.

Joos, Martin. 1952. The medieval sibilants. *Language* 28. 222-231.

Jordan, Richard. 1974. *Handbook of Middle English grammar: Phonology*, (transl. by E.J. Crook). The Hague & Paris: Mouton.

Keller, R.E. 1963. Zur Phonologie der hochalemannischen Mundart von Jestetten. *Phonetica* 10. 51-79.

Ketterer, K. 1942. *Experimentelle Dialektgeographie des Alemannischen in Baden*. Part I. *Die Konsonanten*. Berlin: de Gruyter.

Kieckers, Ernst. 1928 (reprint 1960). *Handbuch der vergleichenden gotischen Grammatik*. München: Max Hueber.

Kirschstein, Bettina. 1962. Sprachliche Untersuchungen zur Herkunft der althochdeutschen Isidorübersetzung, insbesondere zur 'Murbacher These'. *Beiträge zur Geschichte der deutschen Sprache und Literatur* 84 (Tübingen). 5-122.

Klatt, D.H. 1976. Linguistic uses of segmental duration: Acoustic and perceptual evidence. *Journal of the Acoustic Society of America* 59. 1208-1221.

Krause, Wolfgang. 1968. *Handbuch des Gotischen*. 3rd ed. München: Beck'sche Verlagsbuchhandlung.

---------- 1971. *Die Sprache der urnordischen Runenschriften*. Heidelberg: Winter.

Kufner, H.L. 1960. History of the Central Bavarian obstruents. *Word* 16. 11-27.

---------- 1972. The grouping and separation of the Germanic languages. *Toward a grammar of Proto-Germanic*, ed. by F. van Coetsem and H.L. Kufner, 71-97. Berlin: Niemeyer.

Kuhn, S.M. 1970. On the consonantal phonemes of Old English. *Philological essays: Studies in Old and Middle English language and literature in honor of Herbert Dean Merritt*, ed. by J.L. Rosier, 16-49. The Hague: Mouton.

Kurath, Hans. 1956. The loss of long consonants and the rise

of voiced fricatives in Middle English. *Language* 32. 435-445.

Lessiak, Primus. 1933. *Beiträge zur Geschichte des deutschen Konsonantismus*. Brünn, Prag, Leipzig, Wien: R.M. Rohrer.

Lisker, L. 1963. On Hultzen's "Voiceless lenis stops in prevocalic clusters." *Word* 19. 376-387.

Luick, Karl. 1964 (reprint). *Historische Grammatik der englischen Sprache*. Vol. I., part II. Stuttgart: Bernhard Tauchnitz.

Malécot, A. 1955. An experimental study of force of articulation. *Studia Linguistica* 9. 35-44.

---------- 1970. The lenis-fortis opposition: its physiological parameters. *Journal of the Acoustical Society of America* 47. 1588-1592.

Martinet, André. 1949. Review of *Les mutations consonantiques du germanique. Essai de position des problèmes* by J. Fourquet. *Modern Language Review* 44. 131-132.

Marchand, James W. 1960. Review of *Die zweite Lautverschiebung bei Ostgermanen und Westgermanen* by Otto Höfler. *IF* 65. 205-210.

---------- 1973. *The sounds and phonemes of Wulfila's Gothic*. (Dissertation 1955). The Hague: Mouton.

Matzel, Klaus. 1970. *Untersuchungen zur Verfasserschaft, Sprache und Herkunft der althochdeutschen Übersetzungen der Isidor-Sippe*. Rheinisches Archiv 75. Bonn: Ludwig Röhrscheid.

Meillet, A. 1970. *General characteristics of the Germanic languages*. (Original French version 1917). Coral Gables, Florida, University Press of Miami Press.

Mitzka, Walther. 1954. Die dänische und deutsche Konsonantenschwächung. *Zeitschrift für Mundartforschung*

22. 65-87.

---------- 1959. Review of *Die zweite Lautverschiebung bei Ostgermanen und Westgermanen, Die hochdeutsche Lautverschiebung und ihre Gegenstücke bei Goten, Vandalen, Langobarden und Burgundern* by Otto Höfler. *Muttersprache* 69. 132-134.

Moulton, W.G. 1944. Scribe γ of the Old High German *Tatian* translation. *Publications of the Modern Language Association of America* 59. 307-334.

----------1948. The phonemes of Gothic. *Language* 24. 76-86.

---------- 1954. The stops and spirants of early Germanic. *Language* 31. 1-42.

---------- 1969. The consonant system of Old High German. *Mélanges pour Jean Fourquet*, ed. by P. Valentin and G. Zink, 247-259. Paris: Klincksieck, München: Hueber.

---------- 1972. The Proto-Germanic non-syllabics (consonants). *Toward a grammar of Proto-Germanic*, ed. by F. van Coetsem and H.L. Kufner, 141-173. Berlin: Niemeyer.

---------- 1979. Notker's Anlautgesetz. *Linguistic method. Essays in honor of H. Penzl*, ed. by I. Rauch and G.F. Carr, 241-250. The Hague: Mouton.

Noreen, Adolf. 1970. *Altnordische Grammatik. I. Altisländische und norwegische Grammatik (Laut- und Flexionslehre) unter Berücksichtigung des Urnordischen.* Tübingen: Niemeyer.

Pedersen, Holger. 1962. *The discovery of language.* Bloomington: Indiana University Press.

Penzl, Herbert. 1944. A phonemic change in early Old English. *Language* 20. 84-87.

---------- 1947. The phonemic split of Germanic *k* in Old English. *Language* 23. 34-42.

---------- 1950. Orthography and phonemes in Wulfila's Gothic. *Journal of English and Germanic Philology* 49. 217-230.

---------- 1955/56. Zur Erklärung von Notkers Anlautgesetz. *Zeitschrift für deutsches Altertum* 86. 196-210.

---------- 1956. Review of E. H. Sehrt, W. K. Legner (eds.) *Notker - Wortschatz: Das gesamte Material zusammengetragen von E. H. Sehrt und Taylor Starck. Word* 12. 479-483.

---------- 1959. Konsonantenphoneme und Orthographie im althochdeutschen Isidor. *Mélanges de linguistique et de philologie, F. Mossé in memoriam.* 354-361. Paris: Didier.

---------- 1964a. Die Phasen der ahd. Lautverschiebung. *Taylor Starck Festschrift*, 27-41. The Hague: Mouton.

---------- 1964b. The evidence for the change from *th* to *d* in Old High German. *Studies in languages and linguistics in honor of Charles C. Fries*, ed. by Albert H. Marckwardt, 169-185. Ann Arbor: University of Michigan.

---------- 1968. Die Phoneme in Notkers alemannischem Dialekt. *Germanic studies in honor of Edward Henry Sehrt*, 133-150. Coral Gables: University of Miami Press.

---------- 1969. Zur phonemischen Deutung der *direkten Variation* in althochdeutschen Denkmälern. *Mélanges pour Jean Fourquet. 37 essais de linguistique germanique et de littérature du moyen âge Français et Allemand*, ed. by P. Valentin and G. Zink, 287-293. München: Hueber,

---------- 1971. *Lautsystem und Lautwandel in den althochdeutschen Dialekten.* München: Max Hueber.

Piper, Paul. 1882. *Die Schriften Notkers und seiner Schule.* Vol. I.: *Schriften philosophischen Inhalts.* Vol. II.: *Psalmen und katechetische Denkmäler nach der St. Galler Handschriftengruppe.* (Germanischer Bücherschatz 8,9). Freiburg i.B. und Leipzig: J.C.B. Mohr.

Prokosch, Eduard. 1939. *A comparative Germanic grammar.* Philadelphia: Linguistic Society of America, University of Pennsylvania.

Raevskij, M.J. 1972. Die hochdeutsche Lautverschiebung und das altoberdeutsche System der Geräuschphoneme. *Beiträge zur Geschichte der deutschen Srache und Literatur* 93 (Halle). 8-33.

Rask, Rasmus. 1818. *Undersögelse om det gamle nordiske eller islandske sprogs oprindelse.* Copenhagen.

Reiffenstein, Ingo. 1965. Geminaten und Fortes im Althochdeutschen. *Münchner Sudien zur Sprachwissenschaft 18, Wilhelm Wissmann zum 65. Geburtstag,* part III. 61-77.

Schleicher, August. 1866 *Compendium der vergleichenden Grammatik der indogermanischen Sprachen. Kurzer Abriss einer Laut-und Formenlehre.* Weimar: H. Böhlau.

Schmitt, A. 1931. Media, Tenuis, Aspirata. *Teuthonista* 7. 287-308.

---------- 1947/48. Die neuhochdeutschen Verschlusslaute. *Zeitschrift für Phonetik und allgemeine Sprachwissenschaft* 1-2. 149-177.

---------- 1951. Zur germanischen und hochdeutschen Lautverschiebung. *Zeitschrift für Phonetik und allgemeine Sprachwissenschaft* 3. 1-25.

Schrodt, Richard. 1974. *Die germanische Lautverschiebung und ihre Stellung im Kreise der indogermanischen Sprachen.* Wien: Karl M. Halosar.

Schuhmacher, W.W. 1973. Anfänge einer 2. Lautverschiebung im Nordgermanischen? *Zeitschrift für Phonetik* 26. 375-376.

Schultz, A.S. 1951. Segmental Phonemes of Brienzerdeutsch. *Studies in Linguistics* 9. 34-65.

Sievers, Eduard. 1886. Altangelsächsisch *F* and *B*. *Beiträge*

zur Geschichte der deutschen Sprache und Literatur. 11. 542-545. Also in *Anglia* 13. 15-16 (1891).

---------- 1892. *Tatian. Lateinisch und altdeutsch mit ausführlichem Glossar*. 2nd. ed., new print 1960. Paderborn: Ferdinand Schöningh.

Simmler, F. 1974. *Die westgermanische Konsonantengeminination im Deutschen unter bes. Berücksichtigung des Althochdeutschen*. München: W. Fink.

---------- 1976. *Synchrone und diachrone Studien zum deutschen Konsonantensystem*. Amsterdam: Rodopi.

Sonderegger, Stefan. 1959. Review of *Die zweite Lautverschiebung bei Ost- und Westgermanen* by Otto Höfler. *Kratylos* 4. 191-195.

Steblin-Kamenskij, M.I. 1974. The Scandinavian consonant shift. *Arkiv for Nordisk Filologi* 89. 1-29.

Steche, Theodor. 1937. Zeit und Ursachen der hochdeutschen Lautverschiebung. *Zeitschrift für deutsche Philologie* 62. 1-56.

Stetson, R. H. 1951. *Motor phonetics. A study of speech movements in action*. Amsterdam: North-Holland Publishing Company.

Stockwell, R.P. and C.W. Barritt. 1961. Scribal practice: Some assumptions. *Language* 37. 75-82.

Streitberg, W. 1920. *Gotisches Elementarbuch*. 5/6th ed. Heidelberg: Winter's Universitätsbuchhandlung.

----------, V. Michels, M.H. Jellinek. 1936. *Indogermanische Sprachwissenschaft, Germanisch. I. Allgemeiner Teil und Lautlehre*. Berlin & Leipzig: de Gruyter & Co.

---------- 1971. *Die gotische Bibel*, 6th ed. Heidelberg: Carl Winter.

Stutterheim, C.F.P. 1968. Gothic and phonology. *Lingua* 21. 443-454.

Stutz, E. 1966. *Gotische Literaturdenkmäler*. Stuttgart: Metzler.

Trnka, B. 1967. Prague structural linguistics. *Classics in linguistics*, ed. by D.E. Hayden, E.P. Alworth & G. Tate, 324-336. New York: Philosophical Library.

Valentin, Paul. 1962. Althochdeutsche Phonemsysteme (Isidor, Tatian, Otfrid, Notker). *Zeitschrift für Mundartforschung* 29. 341-356.

van Coetsem, F., H.L. Kufner (eds.) 1972. *Toward a grammar of Proto-Germanic*. Berlin: Niemeyer.

Verner, Karl. 1875. Eine Ausnahme der ersten Lautverschiebung. *Zeitschrift für vergleichende Sprachforschung auf dem Gebiete der indogermanischen Sprachen* 23,2. 97-130.

Voyles, Joseph B. 1968. Gothic and Germanic. *Language* 44. 720-746.

---------- 1974. The phonology of the OHG Isidor. *Probleme der historischen Phonologie*. (Beihefte, Neue Folge Nr. 12 der *Zeitschrift für Mundartforschung*), 69-106. Wiesbaden: Franz Steiner Verlag.

---------- 1976. *The phonology of Old High German*. Wiesbaden: Franz Steiner Verlag.

---------- 1979. The phonology of the OHG Tatian. *Linguistic method, essays in honor of Herbert Penzl*, ed. by I. Rauch and G.F. Carr, 441-493. The Hague: Mouton.

Waterman, John. 1970. *Perspectives in Linguistics*. Chicago: University of Chicago Press.

Weinstock, J. 1968. Grimm's law in distinctive features. *Language* 44. 224-229.

Winteler, J. 1876. *Die Kerenzer Mundart des Kantons Glarus.* Leipzig & Heidelberg: Winter'sche Verlagsbuchhandlung.

Wright, Joseph. 1954 (reprint 1966). *Grammar of the Gothic language*. Oxford: At The Clarendon Press.